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TELEPHONE ENGINEER

Vol. I CHICAGO, APRIL, 1909 No. 4

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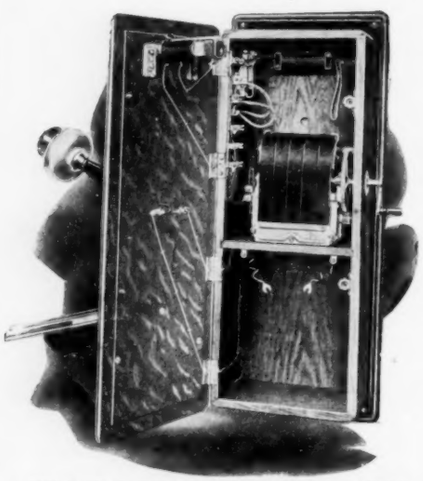
A Transmitter and Receiver which are the same as those supplied to all the large telephone companies.

THE 1317 TYPE TELEPHONE



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CHICAGO, APRIL, 1909.

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THE INCIVILITY OF THE TELEPHONE USER.

TELEPHONE ENGINEER'S offer of $100 in cash prizes for short essays on telephone etiquette, as outlined on page 87 of this issue, has a purpose behind it. Man's incivility to man, as betrayed through the impersonal medium of the telephone, has created material for any amount of newspaper facetiousness and caused the earnest advocate of universal telephony to weep tears of chagrin.

It is not our purpose to attempt to list or specify the various phrases in which a far too great number of telephone users vent their spleen upon each other. Every telephone subscriber or even occasional patron is familiar with them. Impatience, indifference, discourtesy, unwarranted delay and actual rudeness, are all too common.

The casual view of this condition might seem to indicate that humanity in general had merely seized the opportunity which was presented by the physical absence of the interlocutor to indulge in a freedom of expression which might not be entirely safe if rendered *tete-a-tete*.

But analysis shows that this view must be wrong. The psychological influence of association is known, in a general way, to mold even our inmost thoughts more or less in accord with the great average. This means that physical association tends to harmonize mental effort through the natural, if unconscious, deference of one person to another. Self respect on the one hand, or self-consciousness and a species of vanity on the other, smooth out the rough qualities of manner, voice and phrase, and develop the several degrees of courtesy which mark our every day intercourse.

In telephoning, the physical association is lacking. Even the possible influence of the user's immediate surroundings is excluded: for his thought is wholly engrossed in the instrument which demands his attention. And he is not accustomed to the necessity of making an effort to be courteous. He is accustomed to being influenced by his environment and associations—unconsciously, of course, but the man at the telephone has no environment—no association. He is temporarily insulated from the influence of society.

There is little question that the veriest boor as a telephone user would be surprised and mortified if he could hear himself as others hear him. Obviously, the whole problem is one of education. In time, the influence of telephone association will take its place in the social scheme as strongly as physical association. When that time comes we may expect the civility and courtesy of the telephone conversation even to exceed that of the direct address; for the jarring note of incompatible personality will never be present. And inasmuch as any inevitable development may be hastened by educational processes, it is due the men who have put their best effort into the improvement and popularizing of the telephone

that some organized effort be made to better conditions between users.

The operating companies have practically standardized operating courtesy until even theoretical improvement is almost impossible. Further they cannot go. They realize that the development of the whole industry is retarded by the very subscriber who, perhaps, is the heaviest user and the strongest admirer of the service; but they cannot control or dictate his policy.

So, granting that it is possible to educate telephone users to a consideration of the serious nature of this condition, for which they are wholly responsible, Telephone Engineer solicits the aid of telephone men and writers in general in suggesting ways and means for achieving that object. It will not be sufficient merely to criticize existing conditions; that has already been done. The articles that will win the prizes must be of practical value.

They will doubtless be given wide distribution in places where they will do the most good, and will be put to the test of practical application. The contest is open to all readers of Telephone Engineer. There are no restrictions or conditions other than those named on page 87.

THE A. T. & T. COMPANY'S REPORT.

WHEN P. Latzke, Esquire, of New York, started his telephone weekly, a little while ago, he devoted a lot of space to the reason which called the paper into being. He thought so well of the Reason that he ran the same thing over and over again. Some people took the stuff seriously and it wasn't long afterwards until a few independent telephone operators and manufacturers were investing in *Securities'* securities.

The joke in relation to this matter lies in the variance in the Reason as printed and the real reason why the paper was started. They were never alike. We are not going to reproduce the printed Reason, but as Mr. Latzke handed it out to us in an unguarded moment two years ago, pulling down with his right the gloved fingers of his left hand in one, two, three order, this is the real reason:

1. To get William Henry McDonough's scalp.
2. To do the Bell Telephone Company.
3. To make money.

And just to emphasize the truth of this statement and to make the thing clear, we came back at him with: "And, behold, there are last which shall be first, and there are first which shall be last."

The retirement of Mr. McDonough from the field of telephone journalism gave Latzke fewer things to struggle with, but he has quite a little chore on his hands even yet, with reason No. 2 still staring him in the face. The annual report of the American Telephone & Telegraph Company to the stockholders for the year ending December 31, 1908, is just off the press. The copy which has fallen into our hands bears date of March 16.

With the exception of the last six lines on page 20 and the first seven lines on page 21, the report as submitted over President Vail's signature is a financial classic in paper covers. The story is told in twenty-four pages of primer text and six tabulations. The whole involves a clean statement of the condition of the company.

Telephone Engineer advocating competition in both operating and manufacturing sees nothing commendable in the paragraph so obviously misleading as this:

"Two exchange systems in the same community, each serving the same members, can not be conceived as a permanency, nor can the service in either be furnished at any material reduction because of the competition, if return on investment and proper maintenance are taken into account. Duplication of plant is a waste to the investor. Duplication of charges is a waste to the user."

The foregoing is Bell creed. The company has used it so long that the type is left standing from year to year.

"Two exchange systems in the same community, each serving the same members," never has existed and it is reasonable to suppose that two such systems will never be built. Where two systems prevail in any community, the duplication of instruments is very small—varying from seven to ten per cent. After deducting from the duplicated stations, the number which would normally be required in a single system, the percentage of duplication will not exceed six. When two systems exist, the public receives all the benefits of competition. With a single system the natural tendency would be to something less satisfactory.

But the American Telephone & Telegraph Company's report is full of interest, chief of which is the splendid financial showing it makes for an unusually severe year. The balance sheet deals with a total of nearly $441,000,000. By comparison, the company earned a larger net revenue, paid a larger amount in dividends, and set aside to the credit of reserve and surplus more money than in any previous year of its corporate existence. The system comprises 4,364,629 stations, counting everything—a gain for the year of 525,629 instruments. Nearly 1,250,000 miles of iron wire mileage was added to the system in 1908, which does not include the sub-licensees. Something more than 6,000,000,000 exchange connections were recorded. Over $26,500,000 was added to plant in exchanges, toll lines, land and buildings. A trifle less than $40,000,000 was applied to maintenance and reconstruction.

Not the least in interest is the statement that more than 57 per cent of the mileage of exchange wires is underground. The total mileage of wire in use for exchange and toll service is slightly less than 10,000,000.

There has been no change in the relationship of the American Telephone & Telegraph Company and the associated Bell companies. It is a holding concern, holding stocks of associated operating and manufacturing companies. As an operating company it owns and operates the long-distance lines, connecting all systems of associated operating companies with each other. It also performs the general administrative functions of all the associated companies.

We have already pointed out that in face of the adverse business conditions which prevailed throughout the year 1908, the financial statement of the company excelled all previous ones. The report, referring to the stability of the telephone business, says: "Year after year shows an increase, no matter what the prevailing conditions."

The Bell system of the United States includes 5,043 exchanges; 3,467,092 miles aerial wire; 4,625,047 miles underground wire; 6,540 miles submarine wire; 1,668,211 circuits, 98,533 employees; more than 70,000 shareholders; 3,215,245 subscribers' stations. Including all companies connected with the system, the number of stations reach the enormous total of 4,364,629. The average number of daily calls per station is estimated at about six.

The report has its value as an uplift of all telephone securities in America except Latzke's.

If competitive telephony is to thrive it must depend upon literature which will commend the business as an entirety instead of belittling it in spots. There have been many errors of the past, but happily the tendency is upward. The prospect for future development, improvement of existing systems and economics in operating was never better than it is today.

SHOEMAKER SUGGESTS AN UMPIRE.

WE HAVE had four independent telephone conventions during the past month unfraught with excitement beyond the usual routine. There was one exceptional paper presented at Des Moines by James H. Shoemaker, president of the Iowa Association. Every year develops something out of the ordinary among the association papers. Three years ago Missouri sprung its sensation when Billy Scruggs declared that the telephone business couldn't thrive on sentiment. Two years ago Col. Hackett, of Illinois, said something nearly like that. Last year Ohio was responsible for the "idea," that culminated in the best state organization yet devised; but now the Hawkeye president wants an umpire.

But before indulging the subject, a careful rereading of Mr. Shoemaker's paper disclosed the remarkable omission of the various stock phrases which usually characterize independent telephone literature. Please observe that the words Bell, Monopoly, Octopus, Trust, Dear People, Vicious, Unscrupulous, Tyrannical, Greedy, Grasping, and pause—the word independent itself had been inadvertently left out to shiver in the six inches of snow which fell during the convention. Oh, there is hope ahead for honest effort in bringing cosmos out of the chaos in the telephone business.

But about this umpire. If it is to be a politician's job; a position by appointment; one-man, three-man, five-man affair—a commission created by virtue of the law, telephone men should have a care. And they should also have something to say about the matter. A law-made commission to accomplish anything worth while should follow the plan which governs the United States Supreme Court. An umpire to be an appointive success should have a life job. He should come from the field of telephone endeavor, an equal number from each competitive operating branch, the odd member to be selected by the even members. This commission would know the telephone business and keep pace with it. Mr. Shoemaker would be a safe "odd member" in any state.

We have wondered why an organization of telephone engineers have not had confidence enough in their ability to offer remedies for some of the existing harmful practices in exchange operation, accepting as compensation for their expert work a small percentage of the gross annual revenues. There must be opportunity among many of the telephone plants for such effort. It would be national in its scope, or international for that matter, and we are confident that out of such an organization would come the answers to those troublesome, perplexing queries that are now worrying some of the earnest men who are struggling with all their might and money to do the best things for the public and for themselves.

One Hundred Dollars in Cash Prizes

IN an effort to develop a remedy for the conditions of incivility and discourtesy which are so common between telephone users, and which tends to bring adverse criticism upon all telephone service, *Telephone Engineer* offers to its readers a series of four cash prizes for the four best short articles or essays on telephone etiquette. The conditions governing the competition are as follows. The cash prizes offered are:

First Prize, $50.00. Third Prize, $15.00.
Second Prize, $25.00. Fourth Prize, $10.00.

Articles shall not exceed two thousand words in length, and may be as short as desired.

Manuscripts should be typewritten, double-spaced and sent folded, not rolled.

All manuscripts or inquiries should be addressed to "Contest Editor, Telephone Engineer, Monadnock Building, Chicago, Ill."

Receipt of manuscripts cannot be acknowledged, nor will unavailable articles be returned.

The contest will be closed September 1, 1909, and prize winners will be announced in the October number of *Telephone Engineer*; the prize winning articles being printed as soon thereafter as possible.

Articles will be read and prizes awarded by a board of judges, whose personnel will be announced in *Telephone Engineer*.

Telephone Engineer reserves the right to buy, at its regular space rates, such articles as are deemed desirable, although not prize winners.

A TELEPHONE COUNCIL.

CEDAR COUNCIL, No. 283, of the Royal League, St. Paul, Minn., is composed exclusively of employes of the Northwestern Telephone Company, starting with about fifty-five members. The name of the council, "Cedar," is taken from the name of the Northwestern's central exchange.

The main motive in forming the council is to have a telephone man's club, with the added features of the league. Meetings will be held on the second and fourth Mondays of each month in Central hall. The first meeting of the month will be devoted to business and the second will be social in its nature. Talks will be given by officers of the Northwestern company and men well versed in the telephone business for the improvement of the less experienced.

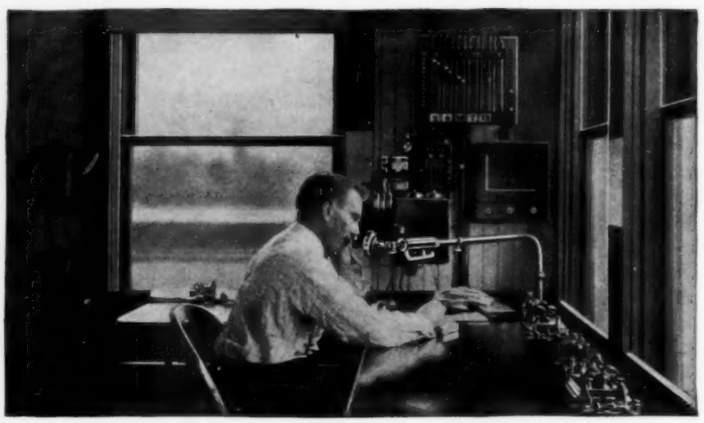
The Telephone for Train Dispatching

By W. E. Harkness

Paper Read Before the St. Louis Railway Club, February 12, 1909

NOTWITHSTANDING the fact that the telephone is being used daily by the public for the transaction of important business even between points at great distances from each other and further that the railroads themselves have for years used it in connection with the handling of the traffic in their terminals, and in emergency for the directing of trains on the main lines, many railroad employees and officials questioned the advisability of using it in place of the telegraph for the issuing and receiving of train orders.

This is not surprising when it is remembered that the telegraph has been almost universally used for this service since 1850, and where properly installed, operated and maintained, has rendered excellent service.



Operator at Way Station, Using Transmitter Arm.

Further, the employees now engaged in telegraph service are naturally adverse to apparatus or methods of operation with which they are not familiar and which they fear may affect their positions. Many of the officials in the operating department of the railroads obtained their early training in the telegraph department, and naturally have a preference for this service, and have hesitated to recommend the use of a system which to them is comparatively new and untried.

The installation and successful operation of telephone train dispatching circuits by a number of prominent railroads throughout the country during the past year has demonstrated beyond a doubt that this service can be rendered by telephone with equal safety, reliability and accuracy, and further, with greater speed and also at a decreased expense than when rendered by telegraph as heretofore.

Owing to the differences which exist in the construction and operation of the railroads throughout the country, the geographical and climatic conditions to be met, and the volume and character of the traffic must be handled, it was believed, by some, that while the telephone could be used on some roads it could not be successfully used on others.

While it is true that the differences noted are important factors in the problem, and that that which will be satisfactory in meeting the conditions existing on one road may not meet those existing on another, it is equally true that with a knowledge of the conditions to be met, and a thorough knowledge of the telephone art a system can be designed to meet the new conditions and render equal and, in the majority of cases, superior service to that obtained with the telegraph.

This has been confirmed by the experience of those roads who have recently installed the telephone for dispatching service as well as those who have for years been using the telephone exclusively for this service or as an adjunct to their telegraph system.

Dispatcher Using Chest Transmitter and Head Receiver.

It may be well to state that as early as 1883, long before the telephone had reached its present high state of development, it was used for operating trains on the New Orleans & Northeastern railroad. In this case the service was rendered over a single iron wire for a distance of about 100 miles and orders issued to four regular trains and numerous work trains. This method of operation was followed for over a year and during this period no accident occurred which could be attributed to the use of the telephone.

The Lake Erie Alliance and Wheeling has been operating a line of single track road for a distance of about 100 miles by telephone exclusively for a number of years with equipment not to be compared with that now available for this service. Thirty trains in each direction per day are handled on this line.

The low grade division of the Pennsylvania railroad between Columbia and Parkersburg, Pennsylvania, a distance of 38 miles, has been operated by telephone supplemented by block signals since August, 1906. The average number of trains passing over this division per day is 95 and the number of cars 4,800, transporting a total of 280,000 tons.

Many of the western railroads have for years been using the composite telephone to assist in the movement of trains. These telephones are connected to existing telegraph lines and while the service rendered is not as good as that which is being rendered by a modern dispatching circuit, it has been of immense benefit in clearing up congestions of traffic or enabling the dispatcher to be notified promptly of break-downs or delays.

In addition to the foregoing there are numerous cases where the telephone is being used, and has been used for years to handle the traffic of large terminals, and, if I am not mistaken, the terminal in St. Louis has been handled in this way for twelve or more years; in fact, the telephone service is absolutely necessary for its successful operation.

The improved line construction and telephone apparatus available today for this service is far superior to that used even five years ago and this, together with the safegaurds already used in the issuing of train orders, is ample to reduce the chance of error to a minimum. It must be remembered, however, that any method of transmitting intelligence involving the co-operation of human agencies is necessarily subject to error and the telephone is not an exception to the rule. It must also be remembered that no mechanical device is free from troubles but all that can be done is to make it as nearly free from trouble as possible, and I believe that the telephone apparatus of today is superior to the telegraph apparatus in this respect, and further possesses the advantage that it can be used by anyone who can talk and hear.

The fact that the telephone can be used by train crews enables the dispatcher to get in direct communication with the conductor or engineer and in case of emergency obtain at first hand the conditions. By equipping the trains with portable telephone sets the dispatcher may be reached from any point between stations in case of break-down.

The location of telephones at sidings which may be connected to the dispatcher's line and thus enable train crews to keep the dispatcher posted as to their movements will be of considerable value.

The Union Pacific railroad is using siding telephones together with signals which are under the control of the dispatcher. These signals are to be used to assist in the movements of trains when changes in schedule can be effected to advantage.

The first of the present type of telephone dispatching circuits was installed by the New York Central & Hudson River railroad in October, 1907, between Albany and Fonda, N. Y., a distance of forty miles. This section of the road is on the main line and has four tracks controlled by block signals.

The Chicago, Burlington & Quincy railroad was the next road to install train dispatching circuits. In December, 1907, a portion of the main line from Aurora to Mendota, Ill., a distance of forty-six miles, with eleven offices was equipped. This was followed by a section between Aurora and Galesburg, Ill., a distance of 125 miles with sixteen offices. A third section between Aurora and Clyde, the end of the Chicago terminals, a distance of twenty-eight miles, with fifteen offices, was equipped. All of these circuits covered a double track road on which reverse movements are made.

The above installations were followed by an equipment on the single track line between Aurora and Savanna, Ill., a distance of 106 miles, with twenty-three offices. This later equipment resulted in convincing many who were skeptical as to the use of the telephone on single track roads, as it was found that not only was the telephone service more satisfactory but safer than on double tracks when reverse movements were made.

These installations were followed by others until at the present time there are over twenty telephone dispatching circuits in use on the C. B. & Q. railroad, covering 125 miles of double track, 28 miles of multi track, and 1,381 miles of single track and connecting with with 286 stations.

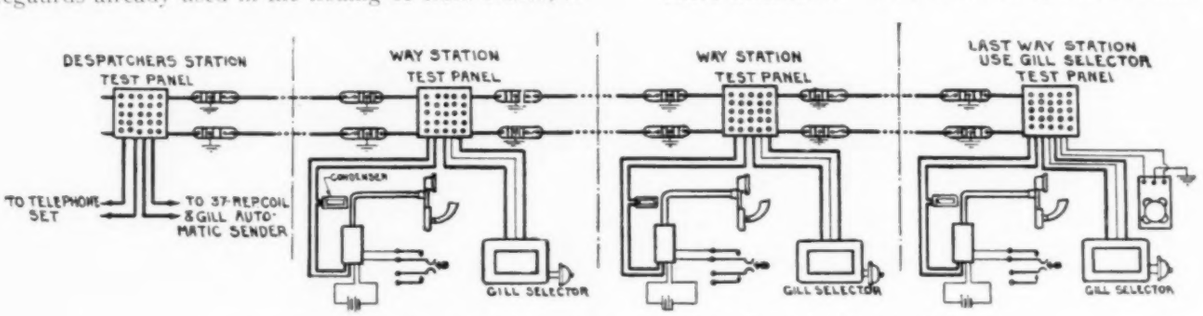


Diagram Indicating Method of Cutting Stations Into Telephone Circuit for Dispatchers' Use.

Other railroads have equipped portions of their lines with telephone dispatching circuits and, except where due consideration of the various factors entering into their individual problems has been overlooked, have been successful in demonstrating the superiority of the telephone over the telegraph.

Among these are the following: New York Central & Hudson River; Lake Shore & Michigan Southern; Chicago & Northwestern; Michigan Central; Chicago, Milwaukee & St. Paul; Northern Pacific; Delaware, Lackawanna & Western; Great Northern; Chicago, Rock Island & Pacific; Union Pacific; Illinois Central; Canadian Pacific; Atchison, Topeka & Santa Fe; Erie railroad; Virginia railway; West Jersey & Seashore railroad. Numerous other roads have ordered equipment for this service or are contemplating doing so.

When it is remembered that this development has occurred in a little more than a year, and has been affected without the occurrence of a single accident which can be traced to the use of the telephone, it must be conceded by even the most skeptical that the telephone is at least equal, if not superior, to the telegraph for this service.

An outline of the factors entering into the problem of rendering telephone service for train dispatching will, it is believed, enable those not conversant with the details of the service to realize what must be considered when preparing for this service and also what has been accomplished by the manufacture of telephone and selective apparatus during the short time in which the demand for such service and apparatus has existed.

The construction of the line for this service is one of the most important matters. In view of the fact that interference to the service affects the earning capacity of the road, great care should be taken to see that the best material possible be used in the construction of the line and that every means be taken to prevent interruptions to the service brought about by mechanical or electrical disturbances on the line.

Hard drawn copper wire of sufficient size to withstand wind and sleet should be used, and the line should be a metallic circuit, i. e., two wires should be used. The wires forming the circuit should be properly transposed and so located in relation to other circuits as to prevent inductive disturbance from other wires or mechanical injury.

The introduction of considerable amounts of cable in the circuits, particularly rubber insulated telegraph cable, should be avoided as it reduces the volume and affects articulation. When cable must be used, lead covered paper insulated telephone cable having the wires twisted in pairs to prevent inductive disturbances should be used, not only on account of its affecting the transmission less than the rubber insulated cable, but also on account of its lower first cost. Cable of this type can be furnished to withstand the potentials used on telegraph circuits, and on account of its low capacity, as compared with rubber insulation, will improve the operation of telegraph service as well as that of the telephone circuits.

When adjacent telegraph or telephone circuits are to be used in cases of emergency as patch circuits for the dispatching circuits, care should be taken to see that they are in first-class condition before being used for this service. In some cases it has been found that such wires, owing to temporary repairs, are of various sizes and kinds of material and contain poor joints which, until discovered and removed, have occasioned poor service and increased the maintenance expense.

When constructing new lines it is well to bear in mind the future extension of the circuits or their use for patching other long circuits in cases of emergency, as considerable saving can often be effected by the proper selection of the kind and size of wire to render the desired service. It may often be more economical to provide wire of a larger size than is necessary at the start to provide for service which will be required in the future.

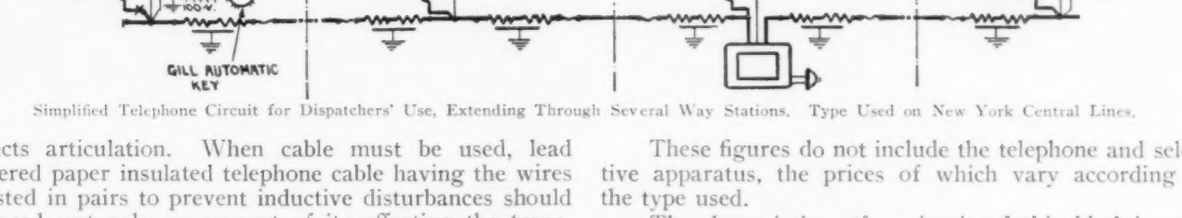
The lines recently constructed for dispatching service have, in general, been well built and with but few exceptions have been free from inductive disturbances or mechanical defects.

Copper wire weighing 210 pounds per mile has been used. This is of sufficient size to render a very high grade of telephone transmission over lines in excess of those now required for dispatching service. With the usual pole line construction of from 35 to 50 poles per mile a circuit of this kind will, with few exceptions, withstand severe wind and sleet storms.

The usual practice is to transpose these circuits every quarter or half mile, depending upon the number and kind of circuits on the same pole line. This has been found sufficient except under abnormal conditions when special transposition must be provided.

In view of the fact that the present pole lines are available for these circuits the expense of building a telephone circuit is not excessive, particularly when the advantages gained by this service are considered.

Such a circuit as those which are now being used will cost approximately $85 per mile or an average dispatcher's circuit covering a division 150 miles in length would cost about $13,000.



Simplified Telephone Circuit for Dispatchers' Use, Extending Through Several Way Stations. Type Used on New York Central Lines.

These figures do not include the telephone and selective apparatus, the prices of which vary according to the type used.

The depreciation of a circuit of this kind is very low as the average life of copper wire is considered to be fifty years. The average life of an iron circuit is from 15 to 20 years under favorable conditions.

The dispatching circuit which should be provided for emergency use may consist of two adjacent telegraph or telephone wires. These two wires should be transposed to prevent inductive disturbances when they are used in the dispatching circuit.

These wires may be used for telegraph or telephone service under normal conditions.

By applying suitable apparatus to two such wires two duplex telegraph circuits and one metallic telephone circuit may be obtained which will permit of four telegraph messages and one telephone message being transmitted simultaneously.

Such a circuit as this has been in use on the Union Pacific railroad between Omaha, Nebraska, and Cheyenne, Wyoming, since last June and has been rendering excellent service. When the telephone circuit is not being used for official conversations between division headquarters, it is used for the transmission of messages which otherwise would be sent by telegraph.

The following figures will give some idea of the traffic handled over this circuit in a month:

Messages handled by telegraph.....		59,020
Messages handled by telephone.....		30,703
Conversations by telephone.....	2,539	
Time consumed by conversations 126 hours, which is equivalent in messages to.....		3,780
Total		93,503

A comparison of the telegraph and telephone traffic on this line in interesting, particularly when it is understood that the telephone messages are handled at a much smaller expense than those handled by telegraph.

Further, the telephone operators handle as high as 450 messages per day and it is believed that this could be increased to a large amount if the line were not used so much for conversations.

(To be concluded.)

Ohio Independent Association Convenes

Columbus was the scene of an enthusiastic meeting of the Ohio Independent Telephone Association March 18 and 19. The meeting was called to order by President Frank L. Beam, Mayor Bond of Columbus delivering the address of welcome. O. H. Perry of the Board of Trade gave a short talk, and response was made by S. H. Grimes.

President Beam's forceful and interesting address was followed by an excellent report from the treasurer. Mr. Beam then remarked that this was the first year that the association had not found it necessary to appeal to the manufacturers for financial aid.

Washington Hyde, H. L. Beatty, J. B. Rhodes, J. H. Ainsworth and R. E. Hamblin, representing respectively districts Nos. 1, 2, 3, 6 and 8, reported good progress and an encouraging outlook for the coming year.

Considerable discussion took place as to the best way to force entrance to Cincinnati. It was stated that 12,000 telephones in surrounding counties demanded access to that city.

E. H. Moulton, president of the International Independent Telephone Association, congratulated the Ohio association on its progress, and talked on the work of the parent association. He advocated the establishment of a large and competent financial institution for the handling of independent securities. The idea was seconded by E. G. Tillotson, president of the Cuyahoga Telephone Company.

The matter of statistics was then taken up, Mr. Moulton urging that all independent companies send complete reports to the International association, and that those that had not already done so should furnish full information to the United States Census Bureau.

Frank A. Davis and D. J. Cable were elected to represent the association on the board of directors of the United States Telephone Company.

The old officers of the association were then reelected as follows: Frank S. Beam, president; O. O. Welsheimer, secretary; Ralph Reamer, treasurer. A banquet held at the Hartman Hotel closed the evening of the first day.

The second day was given over to technical and business discussions, Gansey R. Johnson presiding. J. H. Ainsworth talked on phantom circuits, calling to his aid a series of blackboard sketches. Lockout and selective systems were also discussed, as well as a system of charges by zones.

Raising rates, tree trimming, more substantial construction and the daily inspection of rural lines by rural mail carriers, were other interesting topics.

J. H. Ainsworth described an arrangement he had made with his Bell contemporary, whereby they exchanged lists of delinquent subscribers, each manager refusing to install a telephone of his system until the bill of the other system had been paid. This arrangement was said to be very satisfactory.

Telephone Courtesy in London

In this country it is customary, when the traffic in any telephone exchange becomes heavy enough to make the saving of seconds a consideration, to issue an order to operators to curtail their phrases to the mere necessities of asking or imparting information. Such ornamental expressions as "please," "thank you" and the like are eliminated from the switchboard end of the conversation as consuming, in the aggregate, several precious hours.

The official postoffice circular of the London system contains a long notice of standard expressions to be used by telephonists engaged on trunk work. In the preamble it sets forth:

"In order that abrupt, uncouth expressions may be avoided in the telephone service telephonists engaged in trunk exchanges are in future to make use of the following expressions in connection with their work, and supervising officers should impress upon the staff generally the necessity of adhering to the authorized forms."

Entering into the details, the official preceptor of polite manners lays stress upon the advisability of using the word "please" where it can conveniently be introduced.

"A telephonist answering a call should announce her presence by saying, 'Trunk number, please.' Failing to hear what the subscriber says, she should say, 'What is your number please?' and so when the subscriber's attention has been obtained for the trunk call the telephonist should say, 'What is your number, please?' If the subscriber should be kept waiting for more than the regulation time the telephonist should say, 'Sorry to have kept you waiting.'"

The principle of courtesy in telephone operating is good, of course, but there is more true courtesy in a well-modulated tone of voice and a pleasant inflection than there is in the most eloquent combination of syllables indifferently spoken. That is the American plan; and it saves time.

Forestry Service Telephones in 1908

For the administration and protection of the 182 national forests in seventeen states and territories and Alaska, the United States government last year spent $2,526,098.02, or about one and one-half cents an acre, according to Forester Gifford Pinchot's report. Permanent improvements, including the construction of 3,400 miles of rails, 100 miles of wagon roads, 3,200 miles of telephone lines, 550 cabins and barns, 600 miles of pasture and drift fences, 250 bridges, and 40 miles of fire lines cost $592,169.19. Telephone wire to build approximately 400 miles of additional lines was shipped to the forester, but with the funds available before the close of the year the work of construction could not be completed. Some of this work was done on each of the forests in the United States.

An Example of the Modern Exchange

By Alfred H. Rice

IF Jesse Joplin, the man for whom Joplin, Missouri, is named, were to rise from his unknown grave and revisit the fields where he planted corn and wheat three quarters of a century ago, he probably would be surprised. He would be amazed at the metropolis that has grown in the space of a single generation on the hills and prairies where the jack-rabbit and coyote held sway; at the mills and tailing piles, visible evidence of the giant industry that has developed; at the smokeless smoke-stacks, beneath which gas makes power for a hundred factories; at the hurrying thousands passing along paved streets and through the great buildings.

Not only has the prosperous condition of banks and post-office shown Joplin's flourishing financial condition, but real estate values have been maintained at their standard during 1908, and building has been steadily carried on. With the building of new homes has come a great amount of street improvement, done by the taxpayers, and in the mining metropolis it is hard to find a street which is not properly graded and macadamized or paved.

The city has expanded territorially, too. Annexation proceedings were instituted early in the year that added several square miles of land to the city's boundaries and gave an added population of about 5,000, making an estimated total of 49,000 or 50,000.

The New Joplin Exchange Building.

Joplin is one of the foremost cities of its size in the United States in the matter of public utilities, and these utilities generally are keeping pace with the growth of the city in population and diversity of interests. Now operating into Joplin are four great railroad systems, with another practically completed and two others projected for the near future. Plans for a splendid union depot and terminal facilities are complete, and improvements are contemplated by all the railroads entering the city. Two telephone systems, one of which has erected a building during 1908, furnish local and long distance telephonic communication with all points.

The Missouri & Kansas Telephone Company recently completed the rebuilding of its entire Joplin plant, both inside and out, and now prides itself on the possession of one of the most complete and modern telephone plants in the country.

To accommodate the new equipment, and to center permanently the extensive underground system, a new building was erected at a cost of $20,000. The building is located on Joplin street, between Third and Fourth streets, in the heart of the business district. It is flanked on one side by the post office, and on the other by the Miners' Bank building, one of the largest and most substantial office buildings in the city.

The Telephone Building is two stories in height, with a basement 11 feet high, of which six feet are above the ground line, making practically a three-story structure. Special attention has been given in the plans of the building to reduce the fire risk. It is of slow-burning or mill construction, and all doors and windows exposed to a fire hazard are equipped with metal frames and wire glass. The main stairway from the basement to the first and second floors is of steel and iron construction and will stand, in case of fire, as long as the outside walls remain standing. The enclosing partitions are of expanded metal lath with steel studs. The exterior of the building is in Renaissance style. The front walls are laid up with a special mottled chocolate press brick, with trimmings of Carthage stone and terra cotta, and the general design is such as to give the building a most imposing and substantial appearance.

Since the basement was designed to care for all the power, protective and terminal equipment, much care was given and no expense spared to insure it absolute dryness at all times. It is of "water-pan" construction, that is, from the ground line downward the foundation and floor are completely enveloped by, and rest on an unbroken layer of waterproofing composed of several thicknesses of tar paper, well pitched together and forming a totally impervious barrier

1—General Offices. 2—Public Reception Room. 3—Manager's Office. 4—Operators' Rest Room. 5—Operating Room. 6—Machines. 7—Main Frame. 8—Relay Rack. 9—Storage Battery Room. 10—Power Board. 11—General View of Terminal Room. 12—Wire Chief's Desk.

Interior Views of the New Joplin, Missouri, Exchange.

against moisture. As a further precaution, the wall below the ground line is double, having a one-inch air space between the inner and outer walls. The efficacy of this waterproofing system has been proven several times since the completion of the building.

In the interior of the building mahogany finish and furniture predominate, this being relieved in the retiring room by a restful "forest green" oak finish.

Every provision has been made for the comfort and convenience of the operators and other employes of the company, the management believing that environment affects, to a very great extent, the disposition of the individual, and indirectly through it, the service rendered by the employes.

The outside plant, formerly all of overhead construction, has been replaced by a modern underground plant with "all-cable" distribution. A total of thirty city blocks are fed entirely by underground cable and beyond these limits the aerial cable mains extend with laterals feeding into the center of each block by means of the alleys.

The underground system is very comprehensive, consisting of one and one-half miles of trench and 70,000 duct feet, having a capacity for 13,200 pairs of wires entering the office. A special feature has been made of interior block distribution, and most of the business blocks are without poles and have the wires distributed in rings on the rear walls of the buildings. The larger office buildings have direct underground cable connections.

The present installation consists of 3,250 pairs of which 2,400 pairs are in four cables of 600 pairs each, and the balance is smaller cables.

The underground entrance to the building is by two lines of conduit, those from the north, east and south entering at the front of the building, and those from the west at the rear. Both lines of conduit terminate in a cement vault directly under the main distributing frame, and the cables feed upward to the frame through suitable apertures.

The waterproofing previously described is carried entirely under this pit, which is integral with the basement floor and walls, so that, the used and unused ducts being sealed in the adjacent office manholes, no moisture can be carried into the building.

The subscribers' switchboard, located on the second floor, consists of four sections of the Western Electric Company's well known "Relay" Switchboard No. 1, and is of the eight panel type, the framework having a capacity for 9,600 multiple jacks.

The present equipment is for 2,400 lines. The switchboards and terminal apparatus are all arranged to grow toward the rear of the building so that, should the present facilities for growth be exhausted, an extension to the building and switchboards can be made without affecting in any way the location of the existing apparatus.

The switchboard is thoroughly up-to-date in every respect, and is provided with every modern operating convenience.

The power plant consists of two sets of eleven each Electric Storage Battery Company's cells, one set being of "G-21" capacity, with seventeen plates installed, for the 24-volt service, and the other of "F-13" capacity, with eleven plates installed, for furnishing increased voltage for toll transmission.

The charging outfit consists of two 6,750 watt 30-volt generators, one direct-connected to a Western Electric Company's 11½ horse power, 220-volt single phase alternating current motor, and the other belted to a 12 horse-power White & Middleton Gas Engine.

The terminal apparatus, relay racks, etc., are of the Western Electric Company's standard types, and are so well illustrated in the accompanying photographs as to need no detailed description.

A standard two-position combined wire chief's desk and toll test panel is also installed in the basement within easy and convenient reach of the main frame.

The toll board equipment, also located on the second floor in the main operating room, consists at present of three sections of five panel No. 1 type, with a present equipment of 60 toll lines and six operators' positions. It is arranged for an ultimate equipment of 300 toll lines and may be extended indefinitely to provide the required number of line operators.

The cut-over from the old to the new exchange was accomplished in less than two minutes, without a break in the service. It occurred on the night of February 13. Witnessing the change in the service were several officers of the company and a large number of Joplinites. The first call that flashed over the new exchange came a few seconds after 10:29 o'clock.

The company officials present were General Superintendent C. W. Dainel, General Superintendent of Construction R. C. Matlock, Traffic Manager F. C. Penfield, Equipment Engineer H. L. Hoffman, Press Agent Homer Montford, General Superintendent of Maintenance L. L. Lieshar, Inspector A. C. Lahn, Traffic Inspectors John Wagner and Charles Wagner, Installing Engineer L. E. Corrigan, Traveling Chief Operator Miss Alice Morton, J. L. Gregory, plant chief of the American Telephone & Telegraph Company, and Mr. Davies, of the purchasing department.

The American Institute Dinner

The American Institute of Electrical Engineers celebrated the twenty-fifth anniversary of its establishment by a banquet at the Hotel Astor, March 11, at which a number of the past-presidents and charter members were present. There are twenty-one charter members living; those present at the dinner were: Charles L. Clarke, George A. Hamilton, C. O. Mailloux, T. Commerford Martin, Jesse M. Smith, Elihu Thomson and Elmer A. Sperry. In addition letters of congratulation were also received from Alexander Graham Bell, Charles F. Brush and Thomas A. Edison, charter members. Louis A. Ferguson, president, presided. The speakers were: Jesse M. Smith, American Society of Mechanical Engineers; Prof. Elihu Thomson, past-president, A. I. E. E.; Frank J. Sprague, past-president, A. I. E. E., and Dr. A. C. Humphreys, president, Stevens Institute of Technology.

A feature of the dinner was the presentation to T. Commerford Martin, editor of the *Electrical World*, senior past-president, of a handsome silver loving cup from the other past-presidents. The presentation was made by Mr. Sprague at the close of his address, in which he referred to the important work which has been accomplished by Mr. Martin for the institute and for the electrical industry, and the esteem in which he is held by all those engaged in it.

During the month of October last the number of telephones on farms alone passed the million mark.

How to Read Telephone Circuit Diagrams

By David S. Hulfish

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LESSON IV.

All of the elements going to make up the usual substation telephone equipments now have been studied and their symbols presented. In combining the elements required for a telephone equipment, to produce a skeleton diagram of the circuit of the telephone set, the symbols of the separate elements are drawn upon the page, and are connected by lines representing the wires or electrical conductors of the equipment. The several telephone sets thus drawn in skeleton then may be connected with each other or with central office apparatus by lines representing the line wires of the telephone lines.

Some simple telephone lines with the station circuits in skeleton diagram form will be presented and studied, that the student may become familiar with the methods of assembling symbols into a circuit or system diagram, before the more complex diagrams involving switchboard circuits and details are taken up.

In Fig. 116 is shown a simple common battery circuit for a private line, without signaling devices, but with transmitters and receivers. The receiver is numbered *1*, the transmitter *26*, and the hook lever *58*. These numbers are the numbers of the figures in which those symbols were presented separately, and they also will serve to identify the parts of the diagram when referring to them in the text.

Fig. 116 presents a very simple form of circuit for studying permutations of circuit conditions. Only four permutations exist. First, with the receiver at station *A* off the hook, the circuit between the two line wires is closed at that station, but open at station *B*. Second, with the receiver at station *B* off the hook and with the receiver at station *A* on the hook, the circuit between the two line wires is closed at station *B* but open at station *A*. This is a condition of one station waiting for the other station to answer, and during the continuance of either condition there is no current flowing from the battery *11*, and no possibility of speech transmission, since a circuit for current of any kind does not exist. The third condition is when both of the receivers are off the hooks. This closes a circuit for current from the battery *11*. Note that current may flow from battery *11*, to the right to station *B*, upward and through the closed contact of the hookswitch *58* of station *B*, then through the receiver *1*

Fig. 116. Common Battery Talking Circuit.

of station *B*, which receiver of course will be off of the hook, then up and to the left through the transmitter *26*; then to the left over the line wire to the transmitter *26* of station *A*, then downward and through the receiver *1* and closed contact of the hook switch *58* of station *A* and down and to the right over the line wire to the battery *11*, thus completing a circuit. Current will flow over this circuit continuously until the circuit is broken, and the only places it may be broken are found at the two hook switches, and presumably only by the hanging of one of the receivers upon its hook.

The fourth condition of circuit permutation in Fig. 116 is that in which both of the receivers are upon their hooks, the circuit then being broken in both places. This

Fig. 117. Common Battery Talking and Signaling Circuit.

condition is the state of rest, and is the condition shown in the diagram.

Most circuit diagrams show the apparatus in a condition of rest or idleness, and the various possible, probable or intended conditions of service are left for the reader to solve by a "cut and try" process, in which all of the possible changes are taken into consideration, or are tried until the proper one or at least a reasonable one is found.

Returning to a consideration of the active condition of Fig. 116, in which both of the receivers are off of the hooks, and a circuit for current from battery *11* exists, it will be seen that any variation in the resistance of either of the transmitters will cause variations of the current from the battery *11*, and this varying current passes through both of the receivers at the two stations, so that speech in either transmitter will be heard in both of the receivers. Thus speech may be transmitted from one to the other of the two stations, *A* and *B*, but no provision for signals of any kind other than speech signals is provided.

In Fig. 117, signaling means are added to the circuit of Fig. 116; otherwise, the circuit is the same. Here the permutations are greater in number. Signaling conditions are offered for either station *A* to call station *B* or for station *B* to call station *A*.

Assume that station *A* desires to call station *B*. The telephone user at station *A* turns his hand generator, *112*, generating alternating current and closing the automatic switch shown open, which is its normal position of idleness, and which is a part of the hand generator *112*. Alternating current will flow from the generator *112* downward to the lower line conductor and upward to the upper line conductor, and will find two paths between the two line conductors, forming two complete circuits for current.

The nature of the condensers, *105* of station *A* and *105* of station *B*, must be considered; they will pass the alternating current, but will not pass the direct current which the battery *11* is able to give.

Alternating current flows, therefore, from *112* through the closed automatic switch down to the lower

line wire, to the left, up through condenser *105* and ringer *85* of station *A*, to the right and downward to the generator *112*. This rings the ringer *85* of station *A*. Alternating current flows also from *112* down to the lower line wire and to the right, through the battery *11* to station *B*, up through condenser *105* and ringer *85* of station *B*, ringing the ringer *85* of station B. This current cannot flow up through generator *112* of station *B* because the automatic switch is open when that generator is at rest; neither can the current flow up through the hook switch

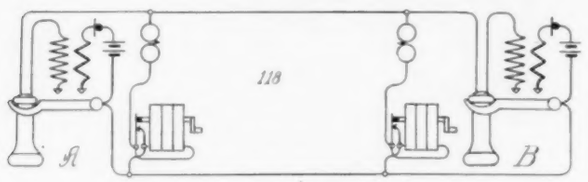


Fig. 118. Local Battery Circuit.

58 and receiver and transmitter of station *B*, because the receiver is upon the hook, and the hook switch contact is open.

Both bells ring when the generator *112* at station *A* is turned. The ringing of the bell at station *A* assures the user of the telephone there that his telephone set is working properly, and that, so far as he is able, he has rung the bell at the distant station, *B*.

The telephone user at station *A* now must await the answer of some person at station *B*, listening meanwhile for the answer by holding the receiver at his ear. The removal of the receiver from the hook closes the hook switch automatically (for this reason the gravity operated hook switch in early days was called an "automatic hook switch") and the talking circuit is ready to be closed automatically when the telephone user at station *B* takes his receiver from the hook to place it in position at his ear for conversation in answer to the ringing of his call bell. Such answering on the part of the station *B* sets up exactly the same conditions as were studied in Fig. 116.

The normal conditions for which the circuit of Fig. 117 is intended now have been studied, since a study of a call by station *A* for station *B* would be just the same when *B* calls *A* except that the drawing would be read in a left-handed direction, as it were. There are abnormal conditions, however, which are worthy of note. Suppose that the telephone user at station *A*, weary of waiting for station *B* to answer, desired to ring station *B* again, and turned the crank of the generator *112* of station *A* without first replacing his receiver upon the hook, or without depressing the hook lever, then current would flow from the lower line wire up through the hook switch, receiver and transmitter of station *A*, and would "ring in the ear" of the user. Also, the user at *A* may ring into the receiver of station *B* while it is in use, or in case it should be left off of the hook by intent or neglect. These are abnormal conditions. Another abnormal condition is the turning of both generators at the same time.

The consideration of abnormal conditions has its principal use in the matter of testing out a circuit informally to detect faults; such consideration is necessary also in studying a new circuit, to determine whether there are any abnormal conditions which are at all likely to occur which would make the line or the system inoperative.

A line having local battery transmission of speech is shown in Fig. 118, with two stations, *A* and *B*. A further difference from the circuit of Fig. 117 is the arrangement of generator and signal bell, the arrangement of Fig. 118 being for what is known as "series" ringing.

In studying first the signaling elements of the line, a call from *A* to *B* will be assumed. User at *A* turns the crank of his hand generator, which not only generates an alternating current, but also operates and opens the automatic switch shown as a part of the generator. Current flows from the generator of station *A* upward, through the ringer of station *A*, to the top wire of the line, and has but one closed path, which is across the top line wire to station *B* and down through the ringer of station *B* and through the closed automatic switch of the generator of station *B*, thence to the left along the lower line wire and up to the generator of station *A*. The current must pass through both of the ringers, as was true also with the circuit of Fig. 117, and both bells are rung. This difference, however, will be noted: In Fig. 118 the current passes through one of the bells and then through the other, all of the current passing through both of the bells serially, whereas in Fig. 117 the current passes through both bells at once and independently, the current which passed through one bell not passing through the other. The arrangement of Fig. 118 is called "series ringing" and that of Fig. 117 is called "multiple ringing" or "bridging ringing." Each system has advantages.

Passing from the normal conditions of ringing to normal conditions of talking in Fig. 118, the user at station *A* takes his receiver from the hook to listen for the response of station *B*. The contacts of the hook switch of station *A* are closed.

A primary circuit thus is closed at station *A* comprising the battery, the transmitter, the primary or heavy wire of the induction coil, one of the contacts of the hook switch, the body of the hook lever, and the connecting wiring. A continuous current flows in this primary circuit, generated by the battery, and when the transmitter is spoken into an alternating potential is created in the secondary of the induction coil.

After station *B* has answered, a circuit for the secondary winding of the induction coil will be formed,

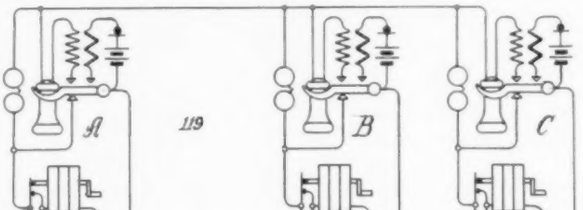


Fig. 119. Party Line Circuit.

as follows: From the secondary of the induction coil of *A* through the receiver of *A* to the upper line wire, thence to the right to station *B*, thence through the receiver and secondary of the induction coil of *B*, through the closed contact and hook lever of the hook switch at *B*, returning over the lower line wire and upward through the closed hook switch of *A* to the secondary winding of the induction coil, completing the circuit. The same secondary circuit is used when the transmitter at *B* is spoken into and the receiver at *B* is off the hook.

Thus either transmitter causes an alternating current to flow over both of the line wires and through both of the receivers. The speaker talks to his own ear as well as to the ear of the distant hearer.

Looking for abnormal conditions, note that a receiver left off of the hook will permit the battery to give current all of the time, which would deteriorate the battery quickly; this is not true of Fig. 116 or Fig. 117 unless both receivers are off. Other points may be noted.

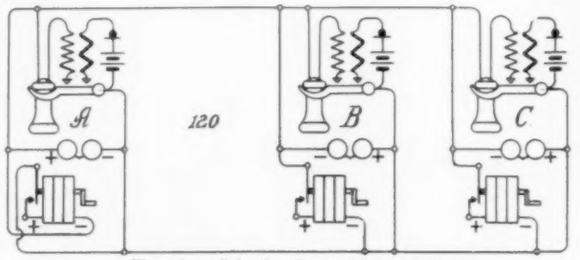


Fig. 120. Selective Party Line Circuit.

A circuit which has been specialized for party-line conditions is shown in Fig. 119. This circuit may be studied particularly as an exercise in permutation reading of circuit diagrams.

The sole difference between a telephone set of Fig. 118 and a telephone set of Fig. 119 is in the connection extending from the middle of the ringing bridge to the under contact of the switch hook. The only difference further is that there are three stations in the system of Fig. 119, whereas there are but two stations in Fig. 118.

The experienced reader of circuit diagrams will take his cue at once. This circuit shows two variations from the normal. Perhaps one of those variations is the cause for the other.

Beginning the study of the diagram by permutations, it is noted first that all of the apparatus of the diagram is shown in the position of rest. The hook switches show the receivers hung up; the ringing bridges are clear with the ringers from wire to wire of the line conductors, ready to receive signals.

As a first change, assume that *A* calls one of the other stations, say *B*. The user of the telephone at *A* turns the generator crank, generating alternating current, which flows upward to the junction point between the generator and the ringer, thence to the right to the hook switch contact, thence through the closed contact to the body of the hook lever, to the right and downward and to the left and again upward to the generator, without passing through any apparatus of any appreciable resistance, and without having had to pass through any ringer. Other paths exist, as may be traced from the generator upward through the ringer of *A* to the right and downward through the ringer of *B* and to the left to *A* again, but this latter path contains the resistance of two ringers. According to Ohm's law, the path of less resistance will take the greater current, and a path of substantially no resistance will take substantially all of the current. The little path from the generator over to the hook switch will take all of the current that the generator will give until that little path is broken, which can be done only by raising the receiver from the hook.

In short, the generator of station *A* is short-circuited as long as the hook lever is down. The user of the telephone at *A* cannot ring anybody's bell until after he has taken his receiver from the hook. At a glance, it is seen that the other stations are the same.

This seemingly strange limitation in the use of the apparatus for signaling may possibly have some explanation in the further permutations or changes which can be obtained upon the system. This is found in the condition where stations *B* and *C* are talking together, and *A* desires to call one of them. If *A* should ring upon the line, it would interrupt the conversation, and ring disagreeably in the receivers of stations *B* and *C*. But by the limiting condition of having his generator normally short-circuited, the user at station *A* is compelled to lift his receiver from the hook, and therefore probably will listen upon the line before turning his crank, and, finding the line already in use, probably will not turn his crank at all, and thus will not annoy the conversation between *B* and *C*.

Still another example for reading is given in Fig. 120, wherein a party line of three stations is represented. Biased bells, and pulsating generators are indicated by the polarity marks adjacent to the symbols for ringers and generators. Taking the direction of current as proceeding from plus sign to minus sign, pulsating current suitable for ringing biased bells will flow from the plus side of any of the generators, out upon the line and through such circuits as can be found, returning to the minus side of the same generator. In the matter of the ringers, current is free to flow through the ringer in either direction, but the armature will respond and the ringer will be rung only when the current comes in at the terminal marked plus and leaves the ringer at the terminal marked minus.

In Fig. 120, when station *A* rings, closing the automatic switch of his hand generator and giving pulsating current, the current flows up through the automatic switch to the top of the generator symbol, thence over the conductor to the left and downward and again to the right upon the line wire at the bottom of the diagram. Three return paths, through the three ringers of the three stations, are found.

First path: At station *A*, upward from the lower line wire to the ringer connection, to the left through the ringer, entering at the side marked minus and leaving at the side marked plus, then downward to the minus side of the generator. This does not ring the ringer of station *A* because the current entered at the minus and left the ringer at the plus sign, thus passing through it in the wrong direction.

Second path: At station *B*, upward from the lower line wire to the ringer connection, to the left through the ringer, entering at the side marked plus and leaving at the side marked minus, then upward to the upper line wire, then to the left to station *A* and to the minus terminal of the generator of station *A*. The ringer of station *B* is rung, because the current passed through it in the direction indicated by polarity signs at the ringer.

Third path: At station *C*, upward to the ringer bridge and to the left through the ringer, and upward to the upper line wire, thence to the left to station *A*. The ringer of station *C* also is rung, because the current passed through it in the proper direction, entering at the plus sign and leaving it at the minus sign.

The study thus far tells us that station *A* is unable to ring its own bell but is able to ring the bells of both station *B* and *C*.

When station *B* rings, pulsating current flows from the generator upward to the top line wire and thence to the left to station *A*, thence downward to the ringer connection, to the right through the ringer, entering the ringer at the conductor by the plus sign and leaving it

at the conductor by the minus sign, thence passing downward to the bottom line wire and to the right and upward at station *B* to the minus terminal of the generator to complete the circuit. The ringer of station *A* is rung therefore by the generator of station *B*.

A path for the ringing current from the generator of station *B* exists also through the ringer of station *B*, passing from the left of the generator, up to the ringer connection, to the right through the ringer, entering at the minus sign and leaving at the plus sign, thence downward, to the left and upward again to the minus terminal of the generator. This does not ring the ringer of station *B* because the current passed through it in the wrong direction, or the reverse direction from that indicated by the polarity signs. Station *B* therefore cannot ring its own ringer.

Another path from generator of station *B* is found through the ringer of station *C*, passing from the generator of station *B* upward to the top line wire, to the right to station *C*, downward to the ringer connection, to the right through the ringer, entering the ringer at the minus sign and leaving it at the plus sign, and therefore not ringing it. Station *B* therefore cannot ring station *C*.

By a separate study, exactly similar to the last, but in which the generator of station *C* may be taken as a starting point instead of that of station *B*, it may be determined that station *C* is able to ring the bell of station *A* but is unable to ring either its own bell or that of station *B*.

To recapitulate for Fig. 120: Station *A* may call station *B* or station C; station *B* may call station *A*, but *B* cannot call *C*; station *C* may call station *A*, but *C* cannot call *B*.

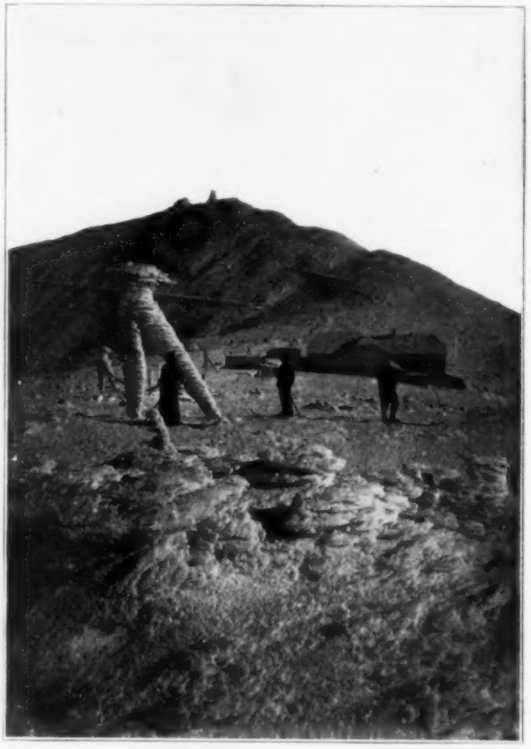
When a circuit diagram is accompanied by a statement of its purpose, its application, or the work which it is intended to do, it may be studied briefly and directly to the point, to determine whether or not it does that which is announced for it. When, however, a circuit is given without announcement of its uses or purposes, it is necessary to read "by permutation," as the term has been defined above, studying all possible combinations of the parts of apparatus shown, to determine all of its possibilities. Such a study should not be called complete until some interpretation of the circuit has been found which fits it for a place in the known practice of telephony, or which accomplishes some new and useful result.

To confirm the study of the circuit of Fig. 120, therefore, it may be fitted to the present practice of telephony in two ways. First, the line may be a party line, with the station *A* the central office, so that either of the stations *B* or *C*, may call the central office without announcing the call to the other station of the line. This is called "silent signaling" and is a desirable feature in party-line operation. Second, the line may be a toll line owned by a party at station *A*. In this case, *A*, *B* and *C* would be in separate towns. When *B* calls *A* a toll charge is made for the use of the line; when *C* calls *A*, a charge is made similarly, and the same when *A* calls either *B* or *C*. But in case *B* desires to talk to *C*, a charge should be made, yet the owner of the line is doing his bookkeeping at *A*; therefore he has arranged the line so that *B* cannot call *C*, nor vice versa, but *B* must call *A* and ask *A* to call *C*. Thus a call cannot be made without the knowledge of station *A*, and this knowledge on the part of that station enables the owner of the line always to make a charge for any conversation between station *B* and station *C*.

(To be continued.)

Telephony in the Silesian Alps

The mountains of Silesia are noted for their heavy frosts. Trees, rocks, telephone and telegraph poles, and even houses, are enveloped in a thick coat of ice and snow, so distorted and grotesque as to leave their true



Frost-Coated Poles in the Silesian Mountains.

form scarcely recognizable. The illustration presented here gives a good idea of the appearance of the telephone poles at such a time. The telephone lines and systems in Silesia are owned by the government, which removes the wires from their over-burdened poles during the winter and stores them out of harm's way until spring.

Right of City to Regulate Telephone Rates

The right of the city to regulate telephone rates has been affirmed by the Supreme Court of the United States. In an opinion by Justice Moody, in the case of the Home Telephone Company, of Los Angeles, Cal., the contention of the city was upheld on every point.

The Home Telephone Company was granted a franchise in 1902, in which was a clause fixing the maximum rates that should be charged for service.

In 1905 the city council passed the public utilities ordinances, requiring public service corporations to file statements each January showing their receipts and disbursements and giving other information on which the council might fix rates for the year beginning the following July.

The Home Telephone Company refused to comply with this ordinance, holding that the city, having entered into a contract concerning rates in the franchise, had no further control over the rates.

Some Questions Answered

By J. C. Kelsey

What has become of the so-called "sticking ringer" trouble, which used to agitate some people's minds?—D. T. S., Iowa.

For several years I have been looking into this matter of ringers, and have conclusively found that the ringers are not at fault, but that the ringing devices are solely to blame.

If you remember, the sixteen hundred ohm ringer seemed to be at the bottom of the trouble. No one seemed to report any trouble with a series, or eighty ohm ringer, nor did they claim any trouble on the thousand ohm type.

The conclusion is that trouble is confined to a heavily loaded bridged line. And in nearly every case, a pole changer of some type is used. In the towns, the series or eighty ohm ringers are generally installed and the pole changers are adjusted to take care of the large amount of current required to ring this type of bell. When this same current is applied to a group of bridged ringers, the pole changers, being adapted to city series conditions, do not measure up to the requirements of the bridged line. Hence, the operator naturally blames the ringer, and, of course, never blames his own ignorance.

I have always claimed that magneto telephone requirements greatly exceeded common battery, as regards proper attention. Common battery is only a simple direct current problem, with the talking currents superimposed, while magneto requirements are based upon pure, and consequently more difficult, laws of alternating current practice.

In the investigation of over one hundred apparently honest complaints of alleged sticking ringer trouble, not one case has not been remedied by a readjustment of office ringing conditions. At the recent Kansas telephone association convention, one very prominent and intelligent operator, who last year was disconcerted over a sudden realization of bad ringing on his telephone system, told me that the installation of a new and satisfactory type of transformer ringing apparatus had entirely eliminated every case of poor ringing trouble on his system. He further said that he was inclined to be ashamed of throwing the burden of his troubles upon the manufacturer, but justified himself properly claiming that the manufacturer was slow in finding out the real trouble, and putting him wise.

One particular case of trouble of ringing was found to be a pole changer weakness, but in addition to an eighty ohm buzzer arrangement in series with the ringing current. The operator felt that she ought to know when the ringing current was being used, and resented the substitution of a lamp in its place—just an ordinary 110-volt lamp. This lamp is entirely noninductive, and will help to equalize the difficulties of handling both eighty ohm ringers, and bridging ringers with the same ringing machine.

The best ringing device today, outside of a regular electrical machine, is the transformer type of ringer machine. The ordinary harmonic pole changer of the 16 2-3 cycle type, will ring every bell on the system. The old fashioned pole changer, a very crude device, actually did fill a long-felt want. But it will not meet the difficult requirements of a combined series and bridging magneto telephone system.

The telephone operator knows that bells will not ring on air, and that it takes electrical energy, of definite quantity, and that if he draws energy from dry batteries, that they will be used up quite rapidly. When any one tells you that a bank of ringing batteries ought to last a couple of years, or six months even, and you are trying to do the signaling for five hundred telephones, or more, tell him gently that you are not handling gold bricks.

No one has ever revealed a case of chronic ringing trouble in a telephone company that has careful engineering supervision, because ringing devices are specified of sufficient strength to do the work. When the farmer requires a field of corn to be cultivated he does not send his two year old son out to do it, but hires a husky youth, who is attracted by the $20 a month and board. And this may be likened to your telephone system. Get a husky ringing machine, and you will no longer have any difficulty.

To economize at the wrong place is a peculiar weakness of mankind. It is a weakness of corporations, families, and all types of activity. To economize with your ringing devices is foolish, because you subject yourself to livery teams, lost time, dissatisfied subscribers and general discontent.

When the doctor knows you have appendicitis, he usually operates on the appendix, not only because he needs the money, but because he knows that the appendix is the fount of all those dangerous pains. He does not drug you, nor does he treat you for typhoid fever or some other disease.

When you have ringer trouble, don't operate upon the man who made and sold you the ringers, but perform an operation upon the pole changer or your ringing pressures and accessories. Usually your disease is only a few feet away, and if handled properly your livery man will starve to death. So get busy, and take a leaf from the old fisherman-apostle Matthew's counsel, which ran like this; Pluck the beam out of your own eye, so you can see more clearly how to take the mote from your neighbor's eye. In this case the manufacturer is the neighbor, and needless to say, has some troubles.

Operators, look to your ringing devices.

I read your answer to a correspondent on the question of depreciation, and do not think $4 per station year is enough. We have an exchange, which has been rebuilt twice, since 1895. The town has 3,500 people, the exchange connects with 750 subscribers, the construction is all overhead, and the service grounded magneto.—H. A. J., Kansas.

I still insist, if you will multiply your station years by four, that it will nearly pay for all your reconstruction. You have had some new construction, because your subscriber list has grown steadily. The fundamental idea of a $4 reserve charge is, that this is the least amount you are justified in reserving. My idea is to establish some figure upon which the entire telephone field will agree, and then we will be better enabled to make a showing before the people, or rather the commissioners, and get higher rates for service.

When I read over the statement of the earnings of a telephone company, and note the comment upon a successful year, and how much has been paid upon common

stock, and then go ahead to add four dollars per station year to the published cost of operating, only to find it represents a deficit, I wonder little that the Chicago Clearing House has refused to acknowledge telephone securities.

That they have done this is of little importance to the telephone industry, at least from my standpoint, because comparative poverty insures slow but stable growth, but it should be important to know that the Chicago Clearing House has only taken action because of this well known fact that reserves have been neglected.

I am not confining these remarks to independent companies, but to all of them. I have found but one Bell licensee that has come anywhere near the $4 reserve account. And take it all around, can you name any general public utility, outside of old steam railways, that the Chicago Clearing House will wax enthusiastic over?

This reminds me that I wish all of our readers could have heard J. H. Shoemaker's paper at the Des Moines meeting of the Iowa telephone association. In the first place, this man is normally known as Jim Shoemaker, and he is now general manager of a telephone company, known as the Corn Belt Telephone Company, with the principal *piece de resistance* at Waterloo. Our friends in the east might smile scornfully at the name, Corn Belt, and think that our friend Shoemaker did not wear sox, or never shaved; but let me tell them, and all of you, that there is a letter B in Corn Belt, and it is the first letter of the word "Brains." He is thinking long and deeply, and he is in a quiet place where the idiot making rumble of Chicago is not heard.

If you have been in a law suit, where the great city lawyer had to face lawyers from the country, or smaller towns, you have observed that the so-called country lawyer has them all going. He has had time to study and to think. He does not spend two hours at the Noon Day lunch club, nor does he kill an evening going to a function, so his family can see Mrs. Potter Palmer, or some other battler in the fearful and bloody and most cruel warfare of all, social supremacy. No, he goes home, and he gets at the meat of the case before the judge does.

So I want every one of you to read every line of that Shoemaker paper. I wish you could have heard him read it. There is a big place for Shoemaker somewhere in the world.

You read that paper closely, and then you will realize some things about this telephone game that you have not thought of before. You will agree that any public service corporation has a chance of being barred from the sweet confidences of the Chicago Clearing House.

Next month, I am going to start on this Shoemaker paper, and keep at it until you all know what was in the author's mind when he wrote it.

The Iowa Independent Convention

The third annual convention of the Iowa Independent Telephone Association was held in Des Moines, March 9, 10 and 11. Heavy storms, demanding the attention of telephone managers prevented a very large attendance, but the 250 or more who did come declared themselves greatly benefitted.

President J. H. Shoemaker opened the convention on the afternoon of the eighth and announced the following committees:

Credentials—W. H. Barker, F. M. Boardman and E. E. England.

General Business—H. A. Douglas, J. M. Plaister and J. C. Thorne.

Auditing—L. M. Grimes, C A. Patterson and J. M. Rider.

Sergeants-at-Arms—F. R. Musson, Frank McNally and O. A. Repass.

A discussion was opened as to making report to the United States Census Bureau. It was generally conceded that the lack of interest taken in the matter by some of the rural companies had prevented a showing of the full independent strength.

The morning session of the tenth was opened with a paper on "Reasonable Connection Relations," by William Crownover. The following resolution was then introduced by P. C. Holdoegel and adopted unanimously:

"The Iowa Independent Telephone Association representing more than $10,000,000 of taxable property, all owned and operated by citizens of Iowa, declare frankly and firmly in favor of a public utility law governing all public service corporations.

"The recommendations made by Governors Carroll and Garst entitle them to take a position with the more advanced thinkers of economic and municipal questions. This association has never been in politics; but notwithstanding the tirade of misrepresentation of corporate interest by loose preachers of evil, we will continue to work in the open, and feel justified in making any suggestions, and encourage any legislation we may deem beneficial to the public and our investors. The independent telephone corporations have almost without exception been fair to the public, and certainly deserve credit for farm life made more pleasant, and increased volume of commercial business. The interest of the public, the corporation and the investor is identical; and, knowing this, we protest against appeals to public prejudice and passions as being detrimental to all three interests and tending to force public service corporations to resort to unfair and dishonest methods, such appeals being made for the sole purpose of diverting public attention from the merits of the questions.

"By no other means than intelligent, stringent, nonpartisan and disinterested regulation, can we hope to eradicate the evils of discrimination, and convince both the corporation and the public that each will have a 'square deal,' and thus bring stability to our business and confidence to the public and investor that is so necessary in order to secure capital to make investments that are absolutely necessary for progress and prosperity of our country."

W. J. Thill, manager of the Iowa Clearing House, reported 70 contracts in force and 60 companies clearing—a gain of 23 companies in the year. J. F. Glenn, W. J. Thill and C. G. Cockerill were then appointed a committee to report on the adoption of a rate schedule.

The afternoon of the tenth opened with an address by Hon John MacVicar of the Des Mointes Commission, in which he urged a friendlier relation between the telephone companies and the public. He was followed by H. S. Baker with a paper on "The Telephone from a Business and Investment Standpoint." President Shoemaker then presented his paper, "Reasonable Returns on Investment," which is printed in full on another page.

S. S. Lichty presented a resolution of appreciation to Charles C. Deering, former secretary and treasurer of the Iowa association, which was adopted.

During the session of the eleventh the following

papers were read: "The Nature of Timber Preservation," by George H. Erich; "Reasonable Objects of Accounting," by George R. Fawkes; and "Reasonable Accounting for Small Companies," by C. A. Peterson. P. C. Holdoegel spoke on the importance of keeping up public interest in the work of the independents.

Under a suspension of the rules the ballots of the assembly were then cast for the election of the present officers for another year. Those re-elected were: J. H. Shoemaker, president, and W. J. Thill, secretary-treasurer, the consensus of opinion among the members being in favor of the "tried and true."

Reasonable Return on Investment

By J. H. Shoemaker

Self-consciousness of society is the distinguishing characteristic of our times, says an acknowledged authority on political economy. In the introduction of his two volumes entitled "The American Commonwealth," James Bryce tells us that the European traveler, on his arrival in the United States, is asked by every chance acquaintance what he thinks of American institutions. And the explanation which Mr. Bryce gives as to why, among all the nations of the world, it is in America only that the traveler is thus questioned is this:

"The institutions of the United States represent an experiment in the rule of the multitude, tried on a scale unprecedentedly vast, and the result of which every one (throughout the whole wide world) is concerned to watch. And yet they are something more than an experiment, for they are believed to disclose and display the type of institutions toward which, as by a law of fate, the rest of civilized mankind is forced to move, some with swifter, others with slower, but all with unresting feet. * * * America changes so fast that every few years a new crop of books is needed to describe the new face which things have put on, the new problems that have appeared, the new ideas germinating among the people, the new and unexpected developments."

It is conceded, I think, that the telephone has been in the forefront of the most marvelous of the unexpected developments. Among the new problems that have appeared, it would be impossible to find one of such immediate importance to the delegates to this convention as that which is involved in the two questions into which the subject assigned me naturally divides:

What rate of returns can most reasonably be aimed at? And, What is the most reasonable plan by which to secure it?

Ambassador Bryce says the institutions of the United States represent something more than an experiment. They disclose the type towards which, as by a law of fate, civilized mankind is forced to move. And, that, therefore, in our country as distinguished from other countries, things continually put on a new face; new problems constantly appear; new and unexpected developments constantly occur. In a word, America changes faster than any other country. I desire to add to his statement this one of my own, that in the management of the telephone business, we as telephone men are pioneering in the pathway of progress.

It has been said that in order to know what we are doing, and to appreciate what we may reasonably hope for, it is necessary to back off and take a good look from a distance. Those who for a year or two have been accustomed to walking up to the clerk's desk and imperatively demanding a "front room with bath on the parlor floor" are prone to forget what real pioneering is. But this fact that we are in the pioneer stage, is, I believe, the matter of greatest significance in the consideration of my subject, because it affects in an important manner every other point that has to be dealt with. We will pause, therefore, just a moment to point out what pioneering means. I have seen twenty covered wagons in a train, with women, children, and cattle walking beside them, hopefully proceeding westward with their placards "Kansas or bust," and later creeping eastward with the original legend crossed out, and underneath it in newer paint, "going back to my wife's folks." I also remember that in those early seventies, farmers made no other preparation for hay than to take a mowing machine to the unsettled prairie, and before hay-harvesting time mow a swath around as much wild grass as each thought he needed, and without controversy the choice of each was respected by all. There was a time, not very long ago, when the lots fronting on Walnut street in Des Moines, which now are worth such a large and definitely determined price per front foot, had never been platted; when this capitol city had never been laid out; when Polk county had not been thought of; and when the word Iowa was known only to the Indians who roamed over what our parents were told by the best geographies was the Great American Desert.

The commonwealths of the Mississippi Valley, which was so recently a wilderness, have been carved out into territories, organized and admitted as states, surveyed, charted and subdivided into counties, townships, sections, acres, and lots, as we find to be the case for miles in every direction from the place of this convention. In the same tedious and painstaking manner the wilderness of detail involved in the business features, and the wilderness of detail involved in the legal or political features, as well as the technical details of the telephone business must be as scientifically surveyed, as carefully charted, and the relative values and importance of each fact and experience as thoroughly demonstrated and agreed upon, as the location, the value, the owner of the title and the rights of the title owner are now agreed upon for every square foot of land in Iowa. The man who would promise to do all or any considerable portion of this surveying and mapping out in an hour, a day, a month, or a year, would be an unreliable civil engineer. On the other hand, procrastination could only be argued intelligently by those who would steal time, that most valuable of all things. It was necessary for the civil engineering corps to make a start in the days of the pioneer in Iowa, in order that the wilderness of the Great American Desert might be mapped out, and in order that title to the frontage on the business streets of the capitol city might some day have a well established value. It is no less necessary that the commercial and civic engineers shall with equal vigor and courage make a beginning in the prosecution of their tasks, in these days of pioneering in the telephone business, even though it be as much greater an undertaking as mind is greater than matter. I will explain what I mean by the expressions "wilderness of detail" in business and in politics or law.

I expect the time to come, as speedily as the mind of man can bring it, when the actual cost of duplicating a telephone plant, a street railway system, a steam railway line, or other public service property, will be a matter of as common knowledge as the cost of constructing a business block. And when that time does come I am confident it will be recognized that the successful launching of the business of such a plant is as inseparable from the real cost, and therefore from the real value of the finished product, as are those very important items which before the satisfactory home is realized the builder of every house finds must come out of his pocket in excess of the original amount estimated by the contractor. The varying percentages to be set aside every month to cover the hazard of sleet storms and all other similar items, will be as definitely determined as the varying rates of insurance against fire in the different localities, and under differing conditions in the United States at the present time. The schedule of standard rates for the different classes of standard service will be as definitely fixed as the present classification of railroads and railroad rates. The privileges and limitations concerning the duplicating of lines in every public place will be as well understood as the regulations for the construction and maintenance of sidewalks. I also believe that as speedily as the mind of man can bring it, the time will come when, in the telephone business especially, our status before the law will consist of more than a mere crazy-quilt patchwork stitched to the original statutes enacted for the primitive post roads. It will be determined, demonstrated and accepted in daily practice just how much the telephone is like the railroad as a common carrier, and how much and wherein it differs. There has been a decision rendered by the United States Supreme Court which holds that

"When the owner of a property devotes it to a use in which the public has an interest, he in effect grants to the public an interest in such use, and must to the extent of that interest submit to be controlled by the public for the common good, as long as he maintains the use."

I am not an expert concerning matters of law, but I think I know what is fair; and it seems plain to me that when a property is devoted solely to a public use under proper legislative regulation it is as sacredly enlisted and as much entitled to protection by the government as the mail carrier's pouch, the policeman's club, the sheriff's right arm, of authority, the soldier's uniform, or the gown of the judge on the bench. I confidently expect, therefore, that when, by proper legislation, public service businesses are regulated and controlled for the common good, the courts will hold also that when a property is devoted solely to a use in which the public only is interested, the public by using the property acknowledges and assumes the responsibility of safeguarding, protecting and compensating the investors of the time, talent, material and muscle that is represented in such property no less than investors in government bonds.

This last mentioned requirement is as inseparable from the immediately preceding quotation from a decision already rendered as one side of the balance that is used by the blindfolded goddess in determining justice is inseparable from the other side of the same balance. It was determined by the Supreme Court in its decision in the Kellogg case that, "Regard for the common good is the highest law of the land." I venture to say that the day is not far distant when the other side of that same truth must also find expression in the decision of a court of equal authority that regard of the public for property that is faithfully and equitably devoted to and used for no other purpose than the common good is just as essential a requirement of the highest law of the land.

Tyranny at the hands of a mob has been found of old to be as cruel as the tyranny of any king, aristocrat, or captain of industry. There is just as grave a possibility that the people in the exercise of their power may lack self restraint, as that the owner of a property devoted to public use may lack self restraint. There must come a check upon the buyer, as there has come a check upon the seller of public service. Merely taking the management, the responsibility and the power to name the price out of the hands of those former captains who won their places as leaders by excelling in the game of business, and turning the management, the responsibility and the power to name the price over to new captains who may win and hold their places by excelling in the game of politics, unless there is restraint in the way of court decisions or enactments, cannot from any of the experience of the past be looked upon as a pleasing or promising prospect for any considerable portion of the people. Every fair minded user of telephone service must agree that it is no nearer right for the users to have unrestricted privilege to pay an unreasonably low rate than it would be for the producers to have unrestricted privilege to charge an unreasonably high rate. Justice demands that the decision as to what is reasonable or fair shall be made, not by either of the two interested parties, but by a third and disinterested party.

The most encouraging tendency of our times is that as a people we are beginning to realize that the square deal is the thing we most need. There seems to be a manifest determination that the wilderness of detail in business, and the wilderness of detail in politics shall be explored and that information shall be accumulated, systematized, and recorded in such manner that it will be as readily accessible and as easy to find out, as it is today to find the value or the name of the title holder of any foot of ground in the Mississippi valley.

It is thought by some that our business is waiting for a Moses. I think it is not so much a leader as a harmonizer that is wanted first. Isaiah knew there was only one way for men endowed with reason to get together. Therefore, he said: "Come now, and let us reason (ourselves) together." William Allen White, who first told us what the matter was with Kansas, is now telling us what the matter is with the

whole United States in a series of magazine articles entitled "The Old Order Changeth," and he pauses to remind us that:

"As long as the rich man votes only for the return of prosperity, and the poor man votes only for the return of the full dinner pail, neither should be surprised if the other tries to rob him. * * * In a hundred years of active life the American people have reduced the fight for social, economic and political progress to its fundamental terms. There was greed in ecclesiasticism, but it was tinctured with fear. There was greed in feudalism, but it was alloyed with the 'divinity that doth hedge in a king,' or a baron, or a lord, or a knight, or what not of tomfoolery. But the greed of democracy is simple, primitive, without sugar coating, and with nothing more to hide it than mere shallow business tradition. The Church has been business; the State has been business; the nobility has been business; but now, thank heaven! business is business. And the problem of democracy in this world seems to be to make business honest."

Or, as I would put the same argument in adapting it to my subject: The problem is to become reasonable concerning business in general and our business in particular.

Reasonableness should be and I believe is the watchword in these times of every man who is inclined to be fair. The word "practical" and such expressions as "practical politics," "practical business methods," or that "business is business" have, by the use which has been made of them, evolved a meaning that is very different from what we understand when we use the term "reasonable." Therefore, Mr. White says, we have the problem as a people of bringing about the change from business is business to where business will be reasonable; and I say that we have coupled with that task the equally difficult problem of bringing about at the same time a change from "politics is business" to where politics also will be reasonable. Unreasonableness is the only explanation and I believe the only cause of all the confusion, contention, and warfare existing in the political, commercial and social life of today. It always takes two or more contending individuals or interests to constitute a quarrel. The path of real progress, as has been said, lies in the direction of volunteered harmony among many, without dictation or dictatorship from any other source than that of reasonableness. And, I am fully persuaded that the most distinguishing characteristic of the telephone business is, that discord is so much more expensive and harmony so much more advantageous than in other lines of endeavor, that in our business first of all will be worked out the plan of practical unity, not alone between various producers; but between all the users and all the producers of our service.

By an effort to agree rather than to argue, I desire to demonstrate my own inclination toward reasonableness. I have found that the best way to arrive at an agreement is to put myself in the other person's place. Therefore, I will undertake to consider my subject from the standpoint of a user of telephone service. And, I will endeavor, in so doing, to exercise as fair-minded and intelligent a self-interest as I am able under existing circumstances to command.

As a fair-minded and fair-intentioned user of telephone service, I must recognize that I need first of all fair treatment in the matter of the rate I must pay for my service. I might get along fairly well without telephone service at all, if my competitors were all compelled to do likewise. I might manage to exist, using a limited service, a service that was defective in quantity or of poor quality, if my competitors were unable to get better service than myself. But as the railroad rebate came to be recognized in its true light, as the smokeless powder by means of which many business careers were ended, without so much as a fear on the part of the assassin that he would be detected, so discrimination in either the rate or the service of the telephone company that I as a user must deal with, must, if I am intelligent and reasonable, be recognized by me as my enemy. And the thing which I, as a user of telephones, should want to satisfy myself about first and most thoroughly is this: Does the producer of my telephone service exercise favoritism? If so, does he do it from his own preference or from compulsion? How much does the discrimination add to the cost of the service? And, if discriminations cannot be stopped until laws are enacted, does not fairness demand that I as a user shall stand responsible for and bear my share of the expense of this "kill or be killed" discrimination, at least until I have done something fundamentally sound and effectual in the way of remedial legislation of the sort that experience has proven indispensable in the preventing of rebates in transportation service?

Discrimination increases cost not alone by reason of the fact that those who pay more must make up for the loss of those who pay less; but in the telephone business so long as discrimination is not illegal, the weaker of two contending exchanges in every locality is compelled to voluntarily die or discriminate. Therefore, by far the greatest hazard that menaces the telephone business today is the hazard of being the unfortunate duelist in this "kill or be killed" struggle which the existing legalized privilege of discrimination has forced into active operation. As a fair-minded, fair-intentioned user of telephone service, I must concede whatever extra inducements I myself would demand for volunteering my own labor, material and management under similar conditions. It costs to secure volunteers for the army. When war has waged hardest it has been necessary to draft men into service; but men, material and experience cannot be drafted into business. Therefore, until discrimination and its unescapable companion, the "kill or be killed" method, are both prohibited by the consent and the command of the users as well as the producers of telephone service; if I am fair-minded and fair-intentioned, I must, as a telephone user, pay my portion of the same increased return on investment that I would demand in the form of bounty or extra inducement before I would volunteer my money in the business. The only thing that could be more unreasonable or more expensive than the existing "kill or be killed" war of discrimination in the telephone business would be for either the user or the producer of telephone service to ignore or to attempt to deny its existence, its enormous expensiveness or that it must inevitably prove fatal to at least one of the contestants.

A fair-minded user of telephone service must see that just as a less-than-cost rate for other persons places an unfair burden of cost upon him, so a less-than-cost rate for himself would place a similar unfair burden of cost upon others. If I am a wide-awake citizen, I must recognize the fact that certain users are getting their telephone service in Iowa at rates which range all the way down to nothing. If I have looked to see what our neighbors are doing in adjoining states, I will know of the fact reported by the Railroad Commission of Wisconsin, that for thirty-two companies dealt with by that commission, for every hundred users of telephones there was an average of eight paying less than standard rates, and that the total amount of the discriminatory service for the thirty-two companies was about thirty-two thousand dollars per year. If I am awake to the facts, I must know that certain influences, which need not now be mentioned, have been at work, and are still at work, causing telephone service to be rendered in numerous instances in Iowa at an absolute loss to the producer, as well as at less than standard rates. If someone should say, "The people who get this free service do not complain, and those who do not get it ought not to spoil the other fellow's 'good thing';" and, if someone else should say that the expense of all free and less-than-cost rates for service comes out of the producer and is, therefore, an advantage to the user; I would reply that every loss of the sort mentioned has the same tendency to increase the rates for telephone service that destruction of property by fire has to increase the premium rates for insurance. It should be plain also that the effort made by individual users so generally to secure special or below standard rates is in principle just as wrong, and is in fact as much of a menace to popular government as is the willingness on the part of the producer to grant the favor. Until the legislature is willing to have a law enacted preventing discrimination in telephone rates, favoritism, I believe, will not be ended.

Efficiency or the best service known to the art, is the thing that is second only to equity in its importance to telephone users. And it is also second only to discrimination in its importance as a factor in determining the rate of returns that may reasonably be aimed at. Instantaneous transmission of intelligence and information is a power that pushes progress. That is why the telephone is now the advance guard or pioneer on every pathway of advancement.

Many a telephone plant and many another public service business that has been an exceptionally important factor in the upbuilding and the advancement of a community, is today being vociferously abused as a robber, by the very people who at the outset ridiculed the undertaking as a crazy business venture; and who have persistently refused to hazard a penny of their own on its success. A fair-minded user of any public service must recognize that public service business, like every other sort of business, is more or less of a game or venture. He must also recognize that the principal reason why Ambassador Bryce can cite us the fact that new and unexpected developments have occurred and new ideas have germinated more rapidly and more constantly in America than anywhere else in the whole world, is because of the premium that has been both hoped for and realized by those who are peculiarly fitted for leadership of this sort,—men who temperamentally enjoy a game, a risk, a venture. Reason tells us that the advancement of the past can only be continued for the future by decreasing the hazard as fast as the premium, the reward, or rate of returns is decreased. But as long as radical improvements are being made, if the user is to be fair-minded, he must be willing that the producer of the service shall have as much extra for taking the risk of having to put in, on account of new inventions, new equipment, before the old has worn out, as the user would demand for taking the same or a similar risk. Of the same nature is that expense which comes from the displacement of originally installed apparatus and material that is made useless because of an increase in the population and the consequent increase in telephone patronage, that the user himself could not have anticipated at the outset. I have been told, by a man who made a personal investigation of telephone service in Europe, that he found one country where on account of the government owning the telephone plant which was originally laid out on a plan smaller than the needs ultimately proved to be, if a man sold out his business and the purchaser neglected to include in the invoice of the articles purchased, the particular detail that the seller's telephone number had been purchased, the seller had left for himself an asset which he could sell for as high as two or three hundred dollars; because the government's switchboard capacity was exhausted, and the government would not throw away the small switchboard and under-sized, outgrown construction. Therefore, the scarcity of lines for business telephones created in the open market a premium of two hundred or three hundred dollars for the opportunity to get telephone service.

From the same farm where once, in common with our neighbors it was our custom to drive to church with our team hitched to a lumber wagon, with inch boards for seats and bed quilts for cushions, they are now going to church in automobiles. And I see ahead in the telephone business a number of stages or steps of advancement corresponding to the various periods of the spring seat, the platform spring wagon, the top buggy, rubber tires, and the automobile. To ignore or deny the fact that the mere matter of keeping up to date in the telephone business entails not alone an item of expense of operation but an element of hazard also, which the user of the service must be willing to meet, would be manifestly unfair.

Economy is the last of the three problems of most direct interest and importance to the user. But he usually tries to solve it first, before he thinks of either equity or efficiency. An attempt to get a cheaper rate than anybody else can get, regardless of the quantity or quality of the service, is the way in which human nature is most apt to manifest itself. The user who can get the lowest rate is usually regarded as shrewd rather than criminal, while the producer who grants the favor is usually looked upon as criminal rather than shrewd. If the business is managed with satisfactory ability, there is but one question to be considered by the user from his standpoint of economy. That is the question involved in our subject,—the question of reasonable returns,—which I prefer to take up later.

The exceptional hazard to which telephone property and telephone equipment is liable, such as sleet storms of the sort we have recently experienced at such tremendous cost, and along such other lines as destruction from lightning and unavoidable or accidental contacts with power currents, etc., and which has thus far, in a large measure, been uninsurable, is another item entering into the expense of the production of service, which the fair-minded user will take into account; and which has the same tendency to increase the returns which investment must have, as similar hazard has to increase the premium rates for insurance of other property.

The question of assurance as to safety and as to permanency of public favor for the investment of labor, material and management that must be put into the telephone or other public service businesses, constitutes an element to be taken into account when reasoning out a rate of returns. There was a time when the public seemed to favor the policy of perpetual and exclusive title to franchises, much after the fashion of perpetual and exclusive title deeds. But franchises are now being made neither perpetual nor exclusive. In order to make clear the point I have in mind in this connection, I desire to make mention of an alleged Quaker, who accosted a farmer working in a field, with the remark that the latter had a very good farm, followed by the question, "Where did thee get it?" "From my father." "And where did thy father get it?" "From my grandfather." "And where did thy grandfather get it?" "From my great grandfather." "And where did thy great grandfather get it?" Here the farmer became seriously embarrassed,

but finally answered, "He fought the Indians for it." To which the Quaker rejoined, rolling up his sleeves, "I am ready to fight thee for it now."

We all recognize that both the law and public opinion are contrary to the assumption of the Quaker, but he has been brought in at this point for a purpose. If we will imagine the public in the place of the Quaker, and the owners of franchises in the place of the farmer, we will have a better understanding of the reason why the rate of returns should be higher for certain public businesses than for certain private investments. For the private business referred to, both the statutes and public opinion guarantee perpetual and exclusive possession, and the privilege for the owner of the title to take to himself all of the increase in the marketable value that is due solely to the general development of the community. In the public business referred to both the statutes and public opinion deny exclusive and perpetual possession, and prohibit the taking by the corporation of any portion of that increase in the marketable value that is due solely to the general development of the community.

I know a man who owns a vacant city lot worth a thousand dollars. It is not earning a cent of income; on the contrary he has taxes to pay. He has stock in our company on which he gets dividends, besides having the taxes paid by the company. He may be unconscious of the fact, but it is nevertheless a fact, that in his dealings he recognizes the difference which I have referred to.

In regard to his vacant lot inside the curbstone, which is hindering progress, he knows that the people's law and opinion both warrant and defend him, his heirs and assigns forever, in the vested right embodied in the piece of paper he calls his title deed, of taking unto themselves all of that rise in the marketable value of the title that is due to the exclusive and perpetual features of his privilege and the general advancement of the community. In regard to his property outside the curbstone, which is being constantly used to the utmost for the promotion of the best interests of the community, he knows that whereas the people's law and opinion formerly accorded a vested privilege very similar to what he still enjoys inside the curbstone, there has been wrought a change in both the people's law and opinion concerning his piece of paper which he calls a franchise, by reason of which change he is now prevented from taking unto himself any portion whatever of that rise in the marketable value of the title outside the curbstone, which would occur had not the exclusive and perpetual features of that title been withdrawn.

It is stated that an acre of land which originally cost the grandfather of the present owner only a dollar and a quarter, and which has never been seen by the present owners nor had any attention, effort, or further investment from any of its owners, except the mere signing of a ninety-nine year lease and the indorsing of huge checks received quarterly for the rent, is now worth a million and a quarter dollars, in the heart of a great American metropolis. It would have taken a long time for a dollar and a quarter invested in a public service property to grow to a marketable value of a million and a quarter, even in those days when the perpetual and exclusive franchise idea was most in favor, and since by the people's law and opinion franchises are now placed under the less favored treatment in the respects I have referrd to, I am sure all who desire to be fair will accord greater returns to the less favored business.

The average returns realized in other businesses is a matter the user of telephone service must consider if he is to be fair. It has been given out in print recently that on the investments in bank shares for the entire United States for the year 1909, the average return to the investor was eleven per cent. It has been stated that the rise in the marketable value of the title to real estate without improvements, but including business sites, etc., for the whole United States has averaged twelve and one-half per cent compounded annually for every year during the four centuries since the discovery of America. It seems reasonable to suppose that individuals who venture in other lines of business do not expect less returns.

Of course there are instances where no return is realized, and other instances where the entire principle is lost by those who invest in banking, real estate, and other enterprises. There must, therefore, be many instances where exceptional wisdom, management, and good fortune bring even higher returns than the average just quoted. And it would seem that the rate of returns which it is reasonable to aim at in the telephone business cannot wisely be placed lower than the average of other businesses, because if Mr. Jones owns bank stock or a vacant lot or an interest in a merchandising establishment from which he realizes twelve and one-half per cent annually, how can he or others be expected to invest where the rate of returns has been arbitrarily limited to a lower figure?

The inclination on the part of the people to restrict the rate of returns on investment in public service businesses is due in large part, I think, to the exaggerated hopes and promises of those who before figuring for depreciation, for sleet storms, or for displacement by improvements, etc., have assumed that everything was profits and have misled the public as far as they themselves have gone wrong in their own ideas concerning the telephone business.

Municipal ownership of telephones is recognized, I think, as wholly impracticable. The present discussion of regulative legislation demonstrated that those who differ concerning other matters are agreed that the unit for the telephone business must be larger than the municipality. Moreover, in a recent conversation with a man of importance, who favored municipal waterworks, I was interested in learning that he objected to state or federal ownership of telephones because of the peculiar details and the complications of the business.

The state of public opinion is the matter of greatest importance when we come to consider how a reasonable rate of returns is to be realized. The first step in an effectual plan must be taken, I think, in the direction of convincing the public of the fact that the square deal, when applied by the people's law and the people's favor or opinion to the telephone business, will be such an improvement that it will be like getting out of purgatory into paradise.

If I correctly grasp the situation, there is a sense in which our telephone association may be likened to the manager entrusted with the destiny of an important business undertaking. The telephone users of Iowa may be likened to the members or shareholders. The law makers and other representatives of the people may be likened to the directors or trustees. It need be no more reflection upon these directors or trustees or upon these shareholders than it would upon the shareholders or trustees of any other institution to say that the manager, which is this association, should know more about the needs of the business than any one else. And as the managers of many institutions must frequently plead against the policy of paying temporary present dividends to the shareholders by robbing the future permanency and prosperity of their property, so this association must plead as effectually as possible against the policy of robbing the future permanency and prosperity of the telephone business in general, for the sake of temporary advantages to telephone users in the form of less-than-cost rates.

Three difficult classes of people must be dealt with. The one is the promoter who puts out a prospectus promising twenty per cent to investors, while, in the hope of gaining the privilege of raising rates he pleads poverty to those representatives of the people who would regulate his business. Fortunately this class is practically extinct in Iowa. A second is the politician who seeks preferment by advocating a reduction of rates for the services of a plant, without first attempting to get all the facts of the business, and regardless of the destruction and the consequent increased future cost which the fulfillment of his promise must bring. The third is the manager who refuses to recognize the people's power and attempts to defy their efforts to inform themselves concerning his business. As already stated, there is a tendency to honor or envy the user who secures service free or at less than cost while dishonoring and despising those who grant the special favor; and it will prove in the long run just as necessary to have a third party that has no direct or personal interest, to umpire the contest between the user and the producer of telephone service as between football teams—just as necessary as that the judge who decides any other disputed point must, in order to make his decision reliable, be a disinterested person.

Facts concerning the telephone business in general, and concerning the business in our own state in particular need to be emphasized if this association is to perform all of its duties in its capacity as a manager serving the telephone users of Iowa. Some of these facts are as follows:

The capitalization of all the telephone properties in the United States, as shown by the most recent census figures and covering the period up to December 31, 1908, is in round numbers $800,000,000 for 7,000,000 telephones, which is less than an average of $115 of capitalization per telephone. When the value of real estate, buildings, rights of way, and more especially of toll line investments has been given proper recognition, and when it is remembered that farmers' companies find that in addition to contributing their own work without putting it into the account in any manner, they must pay from $35 to $85 per telephone, for the simpler and cheaper form of construction required for their rural service, it must be apparent to all that the actual cost of duplicating the entire existing telephone properties could not be enough less than the present capitalization to come anywhere near evening up the difference between the four and one-half per cent, which the census figures show as the average earned by the telephones of the entire United States for the past five years, and the higher the average rate of returns which I have already mentioned in connection with other businesses.

The users of telephone service in Iowa, as well as the producers of that service should be made familiar with the figures furnished by the census bureau, showing the average rate charged, the operating expense per year for telephone service averaged up among all the states as a whole, and averaged individually for each of the states that touch Iowa. It is as follows:

AVERAGE PER TELEPHONE PER YEAR.

State—	Gross Income.	Operating Expenses.	Perct in excess of Iowa.
Average for Iowa	$16.35	$10.53	100
Average for Indiana	21.26	13.54	128
Average for Kansas	21.42	12.76	128
Average for Wisconsin	26.16	16.17	157
Average for South Dakota	27.86	15.84	177
Average for Minnesota	30.30	18.30	182
Average for Nebraska	30.63	22.10	184
Average for Missouri	31.81	19.14	191
Average for Illinois	34.61	23.73	208
Average for United States	37.50	24.56	225

It should also be made known that of the $184,000,000 income per year received by all the telephone systems of the United States, the census figures show that $140,000,000, or seventy-seven cents out of every dollar goes for wages and other fixed expenses, leaving only four and one-half per cent on an average for dividends on the stock of all the companies combined.

Some progress is being made in the direction of more reasonable recognition of the real requirements of public service businesses. One public authority has stated that the general rise in the level of prices of all other things acts the same as a reduction and is in fact a relative reduction of all service rates that have not been correspondingly raised. Wages, material and everything for which the income from the service must be paid out have risen and promise to continue to rise. These facts must be made known to the people we serve just as the wage worker makes them known to his employer.

The question of a fair profit is "fraught with such overwhelming difficulties," says another authority, "that it bids fair to become the principal subject about which the public utility legislation and regulation of the next decade will revolve. It is very easy to say, as the United States Supreme Court has in effect said, that it is fair for a public utility to earn the prevailing commercial rate of interest in its own state, and this seems by common consent to be placed at six per cent in most states. But the practical application of this ruling is confronted by difficulties which seem overwhelming. If six per cent is a fair return, and the company can only earn three per cent in 1909, shall it be allowed to earn nine per cent in 1910, or, as in a great majority of cases, if dividends have been far below the six per cent level for a number of years, shall the company be allowed to catch up by slow degrees, to catch up all at once, or never to catch up at all? If the company is not allowed to make good deficiencies which occur from year to year, then it is not being allowed to earn the customary rate of interest. It is safe to say that little or no capital will care to go into an enterprise which has the ordinary business rate of returns as its maximum but gives no assurance at all about the minimum returns."

Another question which I am sure is equally pertinent is this: Shall the company that pays a higher rate of wages to its employees, and charges a lower rate for its service, while at the same time, by superior management earning twelve per cent, be cut down, while a neighboring company charging higher rates and paying lower wages, with all other conditions similar except inferiority of management sustains actual loss, has its rates raised?

This question as to whether or not the lower rate of the more efficiently managed public service plant is to be reduced at the same time that the higher rate of a less efficiently managed plant is being raised, is neither theoretical nor hypothetical. On the contrary, to my mind it is the most immediately pertinent and practical part of the "principal subject about which the public utility legislation of the next decade will revolve."

Census figures as given above show that on the basis of the average per telephone, paid yearly by users of service in Iowa, the people of the whole United States pay on an average $2.25 for what the Iowa people get for $1, and, using the Iowa dollar for the unit, the people of Illinois

pay on an average $2.08; the people of Missouri pay on an average $1.84; the people of Minnesota pay on an average $1.82; the people of South Dakota pay on an average $1.77; the people of Wisconsin pay on an average $1.57; and the people of Kansas and Indiana each pay on an average $1.28.

If, under like circumstances, ten cities or towns of equal size were operated with as wide a variation of charges for service and operating expenses as the ten instances given in the table above, it is pertinent to inquire:

First. Would it be reasonable to raise the rates that were already high, merely because inferiority of management was operating the business at a loss? And should the lower rates elsewhere be reduced merely because superiority of management was making a profit?

Second. In the absence of state-wide regulation, how can comparisons upon a fundamentally sound, or reasonably certain basis of fact be obtained from which to draw safe conclusions as to the superiority or inferiority of the management of the various plants? And

Third. Is not the development of superior management and methods after all the principal object to be sought after? Therefore,

Fourth. Unless superior management is in some way encouraged and inferior management correspondingly discouraged, how is "the six thousand years of the dead level of Chinese civilization" to be avoided? How is our American progress to be sustained and our present attainment to be maintained?

Fifth. The average capitalization per telephone for the whole United States after making reasonable allowances for amounts invested in buildings, toll lines, and so forth, is probably at present less than $75; therefore 37½ cents per month per telephone represents six per cent on the capital invested in the average line and telephone equipment used by each patron. Shall the actual expense required for maintaining, renewing and operating the property under inferior management be recognized by law and the charge for the service increased by law or regulation to where the inferior management shall receive six per cent net, or at least be kept out of bankruptcy, and, if so, what shall be done concerning the better managed plant near by, which by reason of its better management is already earning six per cent on its investment? Shall the better managed plant be allowed to charge the same rate as the law regulates upward for the poorer managed plant? If so, the legalized raise of 37½ cents per month would give to the superior management twelve per cent profit on the basis of the same rate that must be made to give to the inferior management six per cent.

Someone must say what a reasonable rate is. When he has said it he must make good his statement with facts from future experience. We who manage public service businesses still have the opportunity to avoid the mistake made in the testimony of an eminent railroad man who said the only reasonable rate he knew was "All that the traffic will bear," meaning all you can get; which is the proper thing under competition. But we have the advantage of knowing that where regulation is attempted a different basis is demanded. I am sure I know many points that must be taken into account in considering what a reasonable rate should be. I am equally sure that owing to the fact that in our business we are pioneering in the pathway of progress there are many items of expense for which there has not yet been enough time and attention given to determine with sufficient accuracy to warrant procedure, except upon a broad margin of safety. My final word, therefore, would be that as regards the question of reasonable returns and reasonable rates we should take a position somewhat as follows:

First. We are too young as a business and have been too busy adding almost half a million telephones per year in the mere building of our properties to presume to know what experience may finally dictate.

Second. We need uniformity of accounting, standardization of rates, service and methods and elimination of discrimination for a considerable length of time before we, or any other person, can determine what a fair average rate for fair average management really would be. And we cannot get these without state authority to compel the unwilling ones to conform to the same general plan at the same time.

Third. We are both willing and anxious to proceed as vigorously as possible and as fast as legislation will approve in the directions indicated as being necessary.

Fourth. We are willing to have the stability and permanency of our business increased and the hazard and the cost of service correspondingly decreased by legislative regulation, which is the only means by which these results, beneficial alike to the producer and the user of our service, can be secured.

Fifth. We are anxious to have our rates regulated to a basis where our investment will receive permanently the same average rate of returns from the same average standard of management that is received on an average by other successful businesses, if we may be assured of this eminently fair basis being ultimately provided just as unquestionably whenever and wherever it requires raising rates as when it requires lowering them. And we believe this is as fair and definite a position as can be taken under existing circumstances.—*Paper read at Iowa Convention.*

Recent Telephone Patents

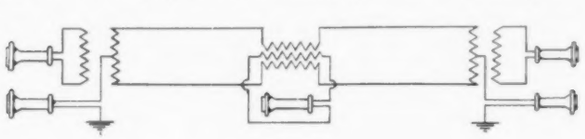
By David S. Hulfish

It will be the purpose of this department to list all United States patents, as they are issued, which pertain to any branch of the telephone business, giving such data in each case as will enable the reader to judge whether he wishes to see the complete drawings and specifications of the patent. When patents of special interest to TELEPHONE ENGINEER readers are encountered, the descriptive matter herein will be amplified accordingly. A complete copy of drawings, specifications and claims of any patent listed will be furnished from this office upon receipt of ten cents.

911,274. Coin Holder. A coin magazine for holding and delivering coins. A convenience when installed upon the wall near a coin-prepayment telephone box. Allen E. Smith, Chicago, Ill.

911,338. Switchboard Jack. A jack of the single-mounting type, in which each jack is an integral unit and may be attached separately to its supporting jackboard. A sheet metal frame and a screwthreaded thimble passing through the jackboard and into the sheet metal frame are the principal features. The side braces of the jack are so disposed as to make the contacts visible. Charles H. Smith, of Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, of same place.

911,339. Indicating Key. In ringing party lines with a four-button key, indicating means for determining which button was used in ringing are a convenience, if not a necessity. Mr.



911,744.

Smith provides four little dials, one for each key, and each having a white target line upon it. When any ringing button is depressed, its dial shows the target line in a new direction, while any dial previously out of normal position is restored. Charles H. Smith, Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, of same place.

911,377. Indicating Key. A four-button ringing key for party lines is shown. Each ringing button has a central portion forming a signaling device to indicate which button was last depressed. The central portion of the key is attached to a central rod in the key stem, and this plunger is caught by a small hook and held down upon the key last depressed, any previously depressed indicating elements being at the same time restored. Guy M. Campbell, of Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, of same place.

911,438. Receiver Attachment. An attachment for head-telephones for the protection of the ear of the user. William E. Peters, Athens, Ohio.

911,531. Acousticon. An arrangement of battery, transmitter and receiver, adapted to assist the deaf to hear. Charles H. Viggars and Ernest H. Stolz, of Chicago, Ill., said Viggars assignor to Stolz.

911,565. Alarm and Telephone System. The line conductors are equipped at the substation with telephone equipment and with telegraph transmitters also. At the central office, the line normally controls both a calling lamp upon a telephone switchboard, and a recording telegraph receiver; when the operator plugs up the line, the telegraph recorder is cut from the line circuit. Garrison Babcock, of Rochester, N. Y., assignor to Mertor E. Lewis, of same place.

911,714. Substation Telephone. An improvement which may be used as a modification in telephone equipments of the ordinary types. It is stated that the ordinary circuits are not interfered with, but that an additional circuit from the line circuit to the local circuit is added to the standard telephone circuits, the additional circuit or bridge containing a sound-augmenting coil of special construction. Orla Frazier, of Brazil, Ind., assignor of one-half to William Frazier, of same place.

911,774. Phantom Circuit. A phantom circuit is a name given to a specific method of conducting multiple telephone transmission. When the telephone apparatus is so arranged at the two ends of a telephone line that two conversations may be sent over the line at the same time, one by using the two line wires in series and the other by using the two line wires in multiple, one of the conversations is called a "physical" conversation, or circuit, or connection, and the other is called a "phantom." Sometimes a telephone circuit for conversation is maintained over the "physical" line and a telegraph circuit is maintained over the "phantom" circuit. With this understanding of "phantom," the present invention resolves itself into a method of wiring a phantom station into the middle or intermediate portion of a line carrying a phantom circuit. Repeating coils are used. Henry B. Stone, Providence, R. I.

911,798. Switchboard System. A special relay places the

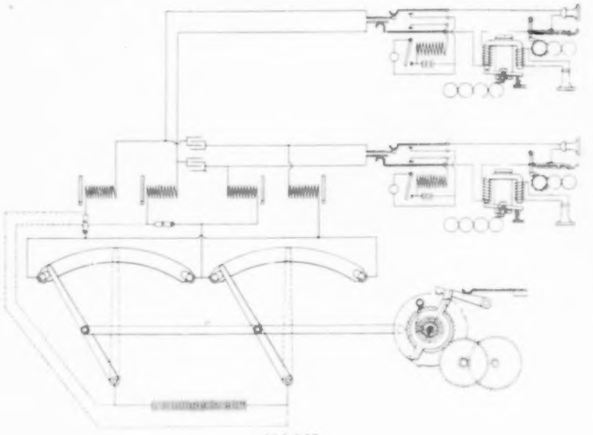
line in direct connection with the operator's telephone set when the line signal of the line is energized. This places the operator in communication with the subscriber as soon as the receiver is lifted from the hook, and the connection through that source continues until the answering plug is inserted into the answering jack. After the insertion of the answering plug, the connection between operator and subscriber must be maintained by means of the operator's usual listening key. William A. Wynne, of Raleigh, N. C.

911,864. Porcelain Cleat. A two-piece cleat, with mortise-and-tenon devices for securing registration. Esar-Haddon Ball, Cedar Rapids, Iowa.

911,866. Desk Telephone. The induction coil and the electrical members of the hook switch are mounted upon a removable disc which is held in the base of the desk stand. Novel means is provided for connection of the conductors leading to the transmitter of the desk set, and novel means is provided also for obtaining the engagement of the hook lever with its electrical switch when the disc mentioned is placed in position in the set. Elmer R. Corwin and Charles E. Bals, of Chicago, Ill., assignor to Corwin Telephone Manufacturing Company, of same place.

912,079. Relay. A large spool head is used, and binding posts are mounted upon and between the spool heads of a pair of spools. Fred B. Corey, of Schenectady, N. Y., assignor to General Electric Company.

912,268. Meter, and System. A complete system of devices for recording the extent of the use of a telephone is provided.



912,268.

Two meters are installed at the telephone substation, one of which counts the calls made, whether successful or unsuccessful, and the other of which measures the time during which the telephone is in use. The call counting meter is operated by the hook lever. The time measuring meter is operated by current over the telephone line, from the central office, the usual common battery talking current being utilized for this purpose. The time meter is controlled by a pawl upon the armature of a polarized magnet, and records one unit of time at each reversal of polarity of the current upon the line. Reversals of the current, therefore, are required at regular and frequent intervals; the device for accomplishing these reversals is novel, and comprises graduated resistances having contact brushes sliding upon them. Charles M. Beattie, of Rochester, N. Y., assignor to the Telechronometer Company, of same place.

912,591. Check Guard. A special slot device for coin collectors which will admit a check of coin size but will not admit a coin of that denomination. The distinction between the check and the coin is made by notched edges upon the check. Max Mendelsohn, Chicago, Illinois.

912,701. Attachment. An antiseptic mouthpiece closure for telephone transmitters. Arthur W. Lyda, Pittsburg, Pennsylvania, and Elmer C. Robinson, Lowellville, Ohio.

912,776. Toll Box. The new features are involved in the locking and unlocking devices. John M. Baker, Saugus, Massachusetts.

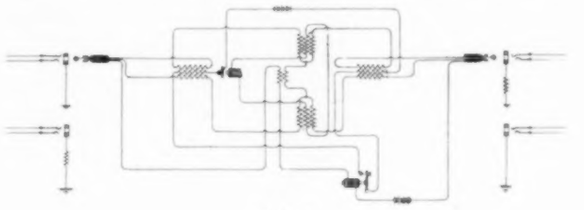
912,778. Plug Attachment. A sleeve or block of soft rubber surrounds the cord at the butt of the plug. Edward T. Banes, Philadelphia, Pennsylvania.

912,822. Telephone System. A common battery switchboard system. The cut-off relay places a shunt upon the line relay. W. W. Dean, Chicago, Illinois, assignor to Kellogg Switchboard and Supply Company, of same place.

912,878. Receiver. A device with two diaphragms arranged edgewise to the user's ear. Arthur H. Nicholson, Wendover, England, assignor to New Phonopore Company, Limited, London, England.

912,908. Repeating System. The invention consists of switching devices whereby the repeater is connected into the circuit automatically when two long lines are switched together. See illustration. John J. Skidmore, Boston, Massachusetts, assignor to American Telephone and Telegraph Company, of New York.

913,080. Ringing Key. Klas Weman, Buffalo, New York.



912,908.

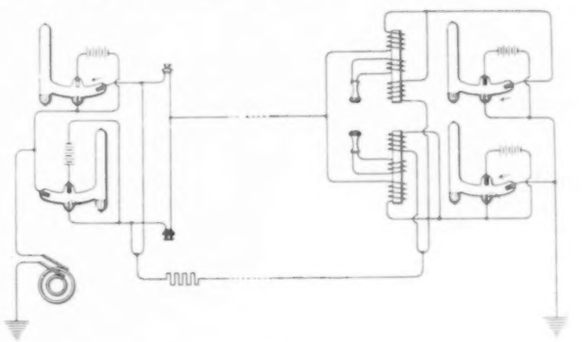
913,264. Cable Terminal. Frank B. Cook, Chicago, Illinois.

913,451. Telephone System. Current for the substation transmitters is fed over both line wires, with earth return. Talking currents are metallic. Garrison Babcock, Rochester, New York.

913,521. Multiple Telephony. An alternating current of high frequency is used in connection with unidirectional valves, effecting a unidirectional transmission over the line. Thus, two messages are passed over the same circuit at the same time, each occupying the line during one-half of each alternation. Marius C. A. LaTour, Paris France, assignor to General Electric Company.

913,528. Signaling System. Sound transmission mechanically through water is combined with wireless electrical transmission through air. By noting the difference in time between the receipt of the same signal by the two methods, the distance to the signaling station may be determined. Robert H. Marriott, Brooklyn, New York.

913,607. Selective System for Private Lines. An interference dial for the tapper rod is provided at each station, with clock train to drive all at uniform speed. An initial ringing current releases all of the dials, which then unlock the several ringers consecutively, a second ringing current being sent when the home dial indicates that the desired station has its ringer unlocked. William E. Zabst, of Portage, Wisconsin.



913,521.

913,613. Automatic System. This patent has reference to an automatic call-distributing of Y-switching system, and its specific scope is to provide means for delaying one of the functions of a partly automatic switch. Sidney H. Browne, Pittsburg, Pennsylvania, assignor to American Telephone and Telegraph Company, of New York.

913,734. Loaded Line. In this system the loading coils have metallic cores which are magnetized by permanent magnets. Isidor Kitsee, Philadelphia, Pennsylvania, assignor of one-half to William J. Latta, of same place.

913,792. Attachment. An antiseptic or germicide lining for transmitter mouthpieces. Augustus A. Williams, Charlotte, North Carolina.

913,795. Testing System for Magneto Multiple Switchboard. Charles S. Winston, Chicago, Illinois, assignor to Kellogg Switchboard and Supply Company, of same place.

913,931. Transmitter. A granular carbon transmitter designed especially to have a high resistance. Charles Adams-Randall, of New York, New York.

913,944. Transmitter. Metallic auxiliary diaphragms are used in connection with a granular carbon cell. Henry P. Clausen, Chicago, Illinois, assignor to American Electric Telephone Company, of same place.

913,947. Mouthpiece. The funnel is formed of glass and a metal threaded portion is provided for attaching it to the transmitter case. William Gibson, Danbury, Connecticut, assignor to Gibson Manufacturing Company, of same place.

914,194. Attachment. Antiseptic lining for mouthpieces. George M. Scroggs, New Orleans, Louisiana.

914,395. Attachment. An antiseptic or disinfecting attachment for mouthpieces. Mary A. Dohney, Chicago, Illinois.

914,468. Lockout System. This is for a common battery line, and the locking-out devices depend for their operation upon the drop of potential from the "dry" or return wire of the metallic circuit and the earth. W. F. Wagner and W. E. Shields, of Toledo, Ohio, assignors to Gravity Lockout Company, of same place.

914,690. Telephone System. A common battery "cordless" switchboard having novel clearing-out features. Frank W. Wood, Newport News, Virginia, assignor to Charles Cory and John M. Cory, New York, New York.

914,715. Telephone Meter. This is a substation meter for automatic telephone instruments, apparently of the Strowger type, which disables the transmitter and affects the receiver when a call is made, the speech transmitting parts being restored to service by the act of registering manually by the subscriber. Vincent D. Greene and Karl W. Fort, Chicago, Illinois.

In Wireless Circles

The wireless telephone people are making considerable headway in Newark, New Jersey. Contracts have been signed by the Radio Telephone Company to take over factory space suitable for the manufacture of wireless telephone and telegraph apparatus. Roscoe Kent, chief engineer of the company, has prepared plans for the installation of the plant.

The new plant is to occupy about 5,000 feet of floor space, in addition to a structure to be built on the roof for experimental work. Electricity is to be used exclusively for the power lathes. At the inauguration of the factory only thirty men are to be employed, but this force is to be augmented as working operations are developed. Most of the force to begin with will be brought from the present plant of the company at the Terminal building, in New York. Cramped quarters, and contracts for the Great Lakes Radio Telephone Company, a subsidiary concern, has rendered the move to Newark necessary. The holding or parent company has contracted to install 21 stations for the Great Lakes company before April 1.

In addition to the manufacture of these stations, other kinds of apparatus for wireless telephone and telegraph equipment will be made in the Newark plant.

Leases have been closed for the placing of a great steel tower on the Hippodrome building, in Cleveland, and for the entire front of the tenth floor of the same structure, the latter space to be used for the general offices of the Great Lakes Radio Telephone Company.

It is aimed to make the tower the receiving point for messages all over the great lakes. Chicago was tentatively picked as the headquarters of the concern, but, owing to Cleveland's central location it was decided to settle there permanently. By spring it is planned to have 75 stations in operation along the great lakes and 1,000 vessels equipped with devices for communicating with the shore station. Eventually it is believed that every craft will have its wireless telephone instruments.

It is believed that many dangers to lake craft and to railroad trains will be averted when the new system of wireless telephone communication is put into effect. Lake vessels in distress can make known their wants. Boats overdue can send messages allaying the fears of waiting friends. Snow-bound passenger trains can send for help and impending collisions can be avoided by communication with the engineers.

Edwin S. Canman, engineering director of the Great Lakes Company, says that experiments have demonstrated that a person can talk 600 miles and that the great lakes can be swept from a single station. Storms, he says, will not interfere with service and mountains can be pierced as easily as the clear air.

The stations will consist of steel towers of varying heights, with a mesh of wires spreading from the top to the base for the purpose of receiving the air waves or vibrations which are sent from one station to another.

Practically every United Fruit Company ship running out of New Orleans, New York, Mobile and Boston will be equipped with both wireless telegraph and telephone apparatus within the next six months, according to M. Musgrave, chief of the wireless department.

New Orleans has five vessels with wireless telegraph, but none of them has the Fessenden telephones. They are the Meridia, Parismina, Cartago, Preston and Ellis. Early in January wireless will be put on the Greenbrier, Appomattox and the Chickahominy, and later on the boats running out of Mobile.

It is stated by Mr. Musgrave that the big high-power wireless station that has been in course of erection at San Antonio, Cuba, for several months will be ready for operation the latter part of winter. Although guaranteed for but 600 miles in any kind of weather, this station will send messages for fully 1,000 miles under ordinary conditions, and is the most extensive of its kind that the United Fruit Company possesses.

Other stations are located at Swan Island, Bluefields, Rama, Port Limon and Bocas del Toro, in addition to New Orleans. These latter stations, says Mr. Musgrave, will send messages for 200 miles, and those on the ships are good for 250 miles.

Two contracts for the furnishing of wireless telephonic service—one with the War Department of the United States government, the other with the War Department of a European power—are among the new possessions of the Clark Wireless Telegraph and Telephone Company, of Detroit. It is said that the Clark Wireless people engage to furnish the United States government with a system of telephonic communication which will be effective between persons on land and navigators in airships or aeroplanes five and ten miles distant.

Cable advices from Europe state that the tests of Professor Majorana's wireless telephone which are being carried on in the Italian navy have proved entirely successful, and it is very probable that the sytem will be soon adopted on all war vessels. The last trial was made between the wireless station of Monte Mario, at Rome, and a torpedo destroyer off the coast of Sicily near Trapani, a distance of over 500 kilometers. The naval officers at each end not only heard distinctly every word spoken, but could even recognize the voice of the speaker. The Italian Minister of Marine is enthusiastic over the invention.

Who's Who in the Telephone Game

BY reeling it off in a hurry—Alexanderelsworthkeith, just like that, you have it in seven rythmic syllables, if you can imagine what a rhythmic syllable is. It isn't so bad, either, considering the great length of it. Also observe in passing that it is only four short of the number of letters required by the manufacturer who makes alphabet blocks a specialty. Commercialized, though, as A. E. Keith, the tendency is to monopolize the written vowels. You can't get away from A. E. when you think of Keith. Of course, they belong to him—he has had them for forty-seven years—they stand for his first and second names and by forgetting them in all of these respects, they still stand for Automatic Engineer. And if Alexander Elsworth Keith is not an automatic engineer he isn't anything. Engineers to be automatic must delve deep into the muck of things. They haven't a precept — every thing must be dug out of the raw. And when you start out to develop an automatic telephone system, well, ask Keith. He's that man!

When he took his first job at 12 they called him Alex. El would have been shorter.

There are seventy-four automatic systems in service in as many cities. They give employment to a horde of people, officers, managers, superintendents, auditors, collectors—everybody but operators, and nobody actually knows what it's all about except the man who made the system from the beginning of things till now.

And the man himself is the hard problem after all. You would expect to see knots in his veins, furrows on his brow, welts on his pate—little bulgy places and hummocks for surplus brain storage. Nothing of the sort. He's just a natural man; a believer in luck with a capital L; a roysterer with his boys; a fan with his car; a digger in his own garden patch; a lover of sunshine. The marvel of it is that the really great haven't had time to find it out.

It is safe to assume that when he took his first job at 12 they called him Alex. El would have been shorter, but boys of 12 never care. Even at this age, Keith got in right—he went to work for the Baltimore & Ohio Telegraph Company at Baltimore, doing things with his head and hands.

He saw the first telephone at the centennial and he wanted it. He wanted it the worst way. Boys of 14, made of the right stuff, get what they want, and young Keith got his the following winter. He got close up to the thing. There wasn't any middle man. He took a job as operator for the Baltimore Bell Company, and operators way back there were pretty much the whole system. It was in these trying days of manual operating that he resolved to banish the job entirely—oust it from the category of human endeavor. He would fix up a machine to do a machine's work.

When he was twenty-two a Washington concern sent him to Venezuela to install electric power and lighting systems, but before he got through with South America he had built a paper mill! It was a case where somebody wanted that kind of a mill and in the absence of the expert to do the work, Keith volunteered. No one is absent where Alexander Elsworth Keith is present. Once upon a time he undertook to read the dictionary through. The book was all right till he struck the D chapter and encountered the word Defeat. He pondered over that for quite awhile before he struck it out with the comment, "Oh, shucks, there ain't no such word!" It didn't fit into his order of things. His children are like him—there ain't no such word as defeat for them. His eldest son is a captain of a high-school basket-ball team—state champions.

When Keith came back to the United States, after a sojourn of three years abroad, he engaged with the Brush Electric Lighting Company, and three years later he joined the Strowger Automatic Telephone Company. This was in 1892. That year an automatic system was installed at La Porte, Indiana. Since then the Strowger system has been planted all over the country.

Keith's inventions are confined almost wholly to automatic telephony. His environment as superintendent of the Automatic Telephone Company is elegant. He has more elbow room than he needs—oriental rugs—mahogany furniture—hammered brass gewgaws and fixings to open and shut his letters, aids of all kinds; but you can never rid his desk of its "rubbish." Men who make things must get their hands on the things. Keith's desk looks like a junk shop, from the remotest niche in the bottom drawer to the surface and the litter is spread all over the top and hanging over the edges. It wouldn't be orderly in any other condition. A. E. wants to get his hands on things.

At his home in Hinsdale he has his play room and the baby has hers—for the Keith baby is a girl. There is a full house of the Keith children, kings up, filled with queens. Father may deprecate his own achievements as a maker of mechanical things, but he betrays no such modesty when his boys and girls are under discussion. They are the balm—never the bane of his existence.

The automatic system of telephony is a Keith day-and-night dream come true. To the telephone man, the scheme is involved in mysticism. To the laymen it is

an unfathomable realism. He can manipulate a dial—something that actual practice has proven that he likes to do—and the performance gets his party, miles away, without other effort. At first the dial was cumbersome. It was almost a misfit for the desk set, but now it has been attached to the idle end of the receiver. By removing the receiver from the hook you actuate the selectors by jiggering a dial not much larger than a watch case. The ringing is automatic. You listen and there's your party.

All automatic machinery is marvelous, but the application of automatic switching is bewildering, made all the more so for its simplicity. What it has meant to the man who is responsible for so much of it can not be read in his face or in his mannerisms. If Keith has had to fight it out on the ruins of failure, the failure was of his own making and he was always willing to shoulder the responsibility either way. He has succeeded. That word success always carries its own reward.

Book Reviews

Telephony, by William C. Boyrer, is a new book from the publication offices of the American School of Correspondence. It is similar to volume five of the American School's "Cyclopedia of Applied Electricity," which bears the same title, and is intended as an aid to the systematic study of telephone work in all its branches. Some 430 large pages cover the subject quite exhaustively; the elementary dissertation comprising Part 1 being especially good.

The table of contents covers divisions treating respectively of Telephone Instruments, Telephone Lines, Telephone Exchanges, Common Battery Systems, Telephone Operation, Telephone Maintenance, Automatic Telephony, Wireless Telephony, Telephone Line Protection, Quality of Telephone Service, and Automatic versus Manual Exchanges. A large number of review questions in the back of the book aid the ambitious student in properly assimilating his reading of the text.

Special articles are contributed upon timely subjects by Kempster B. Miller, A. Frederick Collins, Samuel G. McMeen and H. S. Durant. The book is profusely illustrated throughout with excellent halftone cuts and line diagrams, the latter being distinguished by a clearness and simplicity which is especially praiseworthy in connection with the study of telephone circuits. As a reference work, the value of the book might have been slightly increased by a more comprehensive cross-index. It is bound in red half leather covers, uniform in style with the school library.

Telephone Construction, Installation, Wiring, Operation and Maintenance, by W. H. Radcliffe and H. C. Cushing, Jr., is a practical reference book and guide for electricians, wiremen, engineers, contractors, architects and others interested in standard telephone practice. It gives the principles of construction and operation of instruments and approved methods of installing and wiring; their connection, protection and inspection. Line wiring and the operation of special systems are also treated.

This little book is not intended to supplant other publications on telephone work. Its readers are assumed to know nothing of the subject, and mathematical treatment is avoided so far as possible. All apparatus, parts and circuits are illustrated by line drawings and halftones.

While the work contains nothing new on the subject it should prove valuable as a handy reference volume on the general subject of telephony.

16 mo., in cloth covers. The price is $1.

New Independent Telegraph Company

Material reduction in the telegraph rates between Chicago and St. Louis and Kansas City will be made through the passage by the Chicago city council of a twenty-year franchise for the People's Mutual Telegraph Company, a board of trade syndicate headed by former alderman W. S. Jackson. For a ten-word message this company will charge only 25 cents to St. Louis and 30 cents to Kansas City. For the same service the Postal and Western Union companies now charge 35 and 40 cents, respectively. The People's company pledges itself to maintain as many offices as the needs of the public demand, but at least one in the loop district.

The franchise gives the company the right, upon payment of the usual compensation, to string wires underground from the board of trade building to the elevated railroad structure in Chicago. From there the lines will be strung on the Metropolitan elevated structure to the western city limits. Overhead wires will be run from Chicago to Joliet, where the company will connect with the lines of the independent telephone companies, which will be used for the remainder of the distance. The new system probably will be in operation within sixty or ninety days.

The Humming Telephone

The American Philosophical Society proceedings for 1908 contains a paper by Dr. A. E. Kennelly and Walter L. Upson entitled "The Humming Telephone: A Contribution to the Theoretical and Practical Analysis of Its Behavior." It is stated that the fact that the telephone receiver held either in contact with or close to the face of the transmitter may cause the production of a hum or singing tone appears to have been observed by A. S. Hibbard, and first published in a paper read in 1901 by F. Gill before a meeting of the Dublin section of the (British) Institution of Electrical Engineers.

In many cases it is only necessary to lift a receiver from the hook and hold it face to face to the transmitter in order to produce a hum which may be so loud as to be heard in a distant room through several partitions. The paper gives the result of a large number of experiments made with a view of establishing a theory of the phenomenon. Among the conclusions are that the mean frequency of the humming telephone note is determined solely by the receiver diaphragm and its natural free rate of vibration. On the other hand, the range of pitch vibration and the breaking conditions are determined by the transmitter. For systems that are weak, however, either electrically or acoustically, the range of pitch above or below the mean would be rather small. The primary current is ordinarily a minimum at the mean frequency and a maximum at the break. The paper includes a mathematical discussion of the various elements entering into the phenomenon from which conclusions are deduced as to the relations between it and the frequency and the circuit capacity and conductance.

Items of Legal Interest

By Ralph M. Loring

USE OF STREETS BY TELEPHONE COMPANIES.

A telephone company organized under Comp. Laws 1897, c. 177, amended by Pub. Acts 1899, No. 16, p. 18, providing that telephone companies may maintain wires, with necessary fixtures, along any street or highway in the state, which shall not injuriously interfere with its other public use, attempted to construct its lines through a village organized under Laws 1855, p. 109, No. 60, and Laws 1857, p. 27, No. 27, amended by Local Acts 1869, No. 408, p. 1148, c. 5, section 2, subd. 8, of which provides that the common council shall have power to prevent the incumbering of streets, etc., in any manner whatever. *Held,* that the village had power to wholly exclude the poles and wires from a single block of a street which was its main business block, unless by the adoption of such a regulation the telephone company was cut off from communicating with persons it desired to reach and whom by law it was obliged to serve; and the mere fact that the route designated by the village was less convenient or involved a larger expenditure by the company would not affect the right. *Village of Jonesville* v. *Southern Michigan Telephone Company.* Supreme Court of Michigan. 118 N. W. 736.

RIGHTS OF TELEPHONE COMPANIES UNDER FEDERAL STATUTES.

A telephone company is not within Act July 24, 1866, C. 230, 14 Stat. 221 (Rev. St. Secs. 5263-5268; U. S. Comp. St. 1901, pp. 3579-3581), granting to telegraph companies who accept its conditions the right to construct their lines over the public lands and post roads; nor can a company doing both a telegraph and telephone business claim its benefit as to the lines used in its telephone business. The fact that such lines may be used for the local delivery of interstate telegraphic messages does not make them an integral part of the telegraph lines, so as to bring them within the purview of the act. *Sunset Telephone & Telegraph Company* v. *City of Pomona,* Circuit Court, California, Southern District, 164 Fed. 561.

RIGHT OF WAY—CALIFORNIA STATUTES.

The California franchise act of March 22, 1905 (St. 1905, p. 777, c. 578), which provides, inter alia, that every franchise granted by the governing bodies of counties, cities or town to erect or lay telegraph or telephone wires, "except telegraph or telephone lines doing an interstate business," shall be granted upon the conditions in such act provided and not otherwise, by necessary implication repeals Civ. Code Cal. Sec. 536, as re-enacted March 20, 1905 (St. 1905, p. 491, c. 385), granting the right to telegraph or telephone corporations to construct their lines along and upon any public road or highway, except as to such lines doing an interstate business. *Sunset Telephone & Telegraph Company* v. *City of Pomona.* U. S. Circuit court. 164 Federal 562.

OBSTRUCTION OF HIGHWAY QUESTION FOR JURY.

Sayles' Ann. Civ. St. 1897, art. 698, permitting a telephone company to use the public roads, if done so as not to incommode the public, confers merely a privilege to use the public road provided the public is not incommoded, and a recovery for injury sustained by driving into a guy wire is not necessarily precluded because the wire was not upon the graded and traveled portion of the public road, but whether it was so located as to incommode the public is for the jury. *South Texas Telephone Company* v. *Tabb.* Court of Civil Appeals of Texas. 114 Southwestern 448.

ACTION AGAINST CITY AND TELEPHONE COMPANY AS JOINT WRONGDOERS.

Since plaintiff could sue a telephone company and a city either jointly or severally if his store was burned by their joint negligence, after suing them jointly he could dismiss or discontinue as to either, and afterward take a nonsuit as to the other, without releasing the liability of either, or barring another action against either for the same cause. *Staunton Mutual Telephone Company* v. *Buchanan,* Supreme Court of Appeals of Virginia, 62 S. E. 928.

AGREEMENT BETWEEN TELEPHONE COMPANIES.

An agreement between non-competing telephone companies, occupying different fields, but not possessing a monopoly of the business, to connect their lines so that each should have service to all points on the lines of the other, the tolls for messages over the connected lines to be divided, but forbidding competition between the companies in their respective territories, was not against public policy, and would be specifically enforced. *Wayne-Monroe Telephone Company* v. *Ontario Telephone Company,* Supreme Court of New York, 112 N. Y. Supp. 424.

MUNICIPAL REGULATION.

Municipal regulation of the rates which a telephone company may charge, on a lower scale than those prescribed for a competitor, does not necessarily deny the equal protection of the laws, since such competitor may bring its patrons into communication with a larger number of persons, dwelling in a more widely-extended territory, and may render much more valuable service. *Home Telephone & Telegraph Company* v. *City of Los Angeles.* Supreme Court of the United States. 29 Sup. Ct. Rep. 50.

UNLAWFUL OCCUPATION OF STREET.

A telephone company, which unlawfully occupies the streets of a city with its poles and wires after its franchise to do so has expired, and which has refused the demand of the city that it renew the same, is not entitled to relief in equity because the removal of such poles and wires as obstructions to the streets was ordered by a resolution, rather than by ordinance, or was otherwise informal. *Sunset Telephone & Telegraph Company* v. *City of Pomona.* U. S. Circuit Court. 164 Federal 562.

OBSTRUCTION BY TELEPHONE WIRES.

Though a telephone company maintaining a line over a navigable river is not an insurer of travelers on the river against injury from fallen wires, it is required to build the line at a height sufficient to permit the passage

of boats and to exercise reasonable care to prevent it from becoming an obstruction to navigation. *Heiberger* v. *Missouri-Kansas Telephone Company,* Kansas City Court of Appeals, Missouri, 113 S. W. 730.

RATES.

Charter authority to regulate telephone service and to fix and determine the charges therefor does not empower a municipality to enter into a contract fixing unalterably, during the terms of the franchise, the charges for such service, and disabling itself from exercising the power of regulation. *Home Telephone & Telegraph Company* v. *City of Los Angeles.* Supreme Court of the United States. 29 Sup. Ct. Rep. 50.

PLACING WIRES ONLY THIRTEEN FEET ABOVE ROAD.

A telephone company is guilty of negligence when it places its telephone wires only 13 feet above a road crossing, and permits such wires to become slack and to sag. until they interfere with legitimate travel, when the statute requires such wires to be placed 20 feet above the road crossings. *Weaver* v. *Dawson County Mutual Telephone Company.* Supreme Court of Nebraska. 118 Northwestern 650.

ADVERTISING TELEPHONE FRANCHISE.

That an ordinance for the public sale of a telephone franchise to the owner of an existing franchise eliminates the owner of another franchise as a bidder at the sale does not render it repugnant to Const. paragraph 164, prohibiting monopolies; the purpose of the ordinance being to preserve effective competition. *Louisville Home Telephone Company* v. *City of Louisville.* Court of Appeals of Kentucky. 113 S. W. 855.

DISCRIMINATION BETWEEN PATRONS.

A patron of a telephone company may be unjustly discriminated against in the use of the telephone exchange by the mere enforcement against him of a rule just and proper; it being ignored in favor of others in like situation. *Plummer* v. *Hattelsted,* Supreme Court of Iowa, 117 N. W. 680.

PAYMENT OF TELEPHONE RENT IN ADVANCE.

A rule of a rural telephone company that telephone rent must be paid six months in advance is reasonable; and a subscriber, refusing to comply therewith, is not entitled to service from the company. *Buffalo County Telephone Company* v. *Turner.* Supreme Court of Nebraska. 118 Northwestern 1064.

DUTIES OF TELEPHONE COMPANY.

The same degree of care imposed by law on a telegraph company in delivering messages to addresses is imposed on telephone companies undertaking to secure answers to calls over long distance lines. *Southwestern Telephone & Telegraph Company* v. *McCoy.* Court of Civil Appeals of Texas. 114 Southwestern 387.

DAMAGES FOR COLLISION WITH POLE.

There is no ground for punitive damages where one is injured by driving into a telephone pole in the side of the road. *Bevis* v. *Vanceburg Telephone Company,* Court of Appeals of Kentucky, 113 S. W. 811.

The Making of Telephone Managers

By M. F. Milliken

AT WEEKLY meetings of the heads of departments of the Southwestern Telephone & Telegraph Company it is the custom to discuss and adopt policies and plans for improving and rendering more efficient the conduct of the company's business. At a meeting recently held the topic of training young men, already in the employ of the company, to become managers, was taken up and the conclusion reached that this is a subject which should receive more careful attention than has heretofore been given it.

There is no reason why an ambitious young man taking service with a telephone company in any of its departments and in any capacity may not aspire to and fit himself for a managership in due course, provided he will conscientiously apply himself to the duties assigned him, keep his eyes open and avail himself of every opportunity that presents itself for gaining a knowledge of the various phases of the business.

He may start as a collector in a moderate sized exchange, and in this position he will be afforded chances for studying the peculiarities and eccentricities of the public; he may learn to be patient under abuse; to be polite when other are discourteous and to govern his temper under adverse circumstances, and the acquisition by him of these qualities will prove to be assets of incalculable value in the after years. As a collector he is brought in close association with the manager who keeps the books, or with the bookkeeper, if there is one, and by a little inquisitiveness and insistence, and with the aid of either of these functionaries, he may shortly get an insight into the company's system of bookkeeping and accounting, an indispensable requirement for the manager of any exchange. In like manner, he should cultivate the man in charge of the switchboard and apparatus and learn from him and from the construction foreman all that is possible in regard to these important departments. The knowledge thus gained could profitably be supplemented by reading some of the elementary work on electricity and the telephone, as well as trade papers. Primarily, however, it is the practical experience acquired through going up against actual conditions which will prove of value to the young man who aspires to a managership.

Then there is the young man who begins in the shop and who may afterwards become an inspector. To him peculiar opportunities are afforded for investigating the apparatus used by the company and familiarizing himself with switchboards and accessories. He should not be content simply with discovering that certain results are brought about under certain conditions, but also how and why this is so.

In other words, his knowledge of these things should

not be superficial or perfunctory, but thorough and complete. With this information, and by diligently endeavoring to acquire knowledge in regard to bookkeeping and accounting, these young men can render themselves available for the higher positions in the service.

And it is not alone the young men employed in the departments specially designated in this article that are eligible to higher positions, but it must be understood that the door of opportunity is open to all, and where the disposition is evinced on the part of any company's employes to advance, it is usually the intention of the company to encourage to the full such a laudable ambition.

It is particularly desirable that managers having in their employ young men who give promise of developing ability of a kind calculated to fit them for managerial duties shall lend every help and encouragement to such. It would be well, too, for managers, when employing new men, to have in mind their availability as future managers of the smaller exchanges where they may develop capabilities likely to result in advancement to more responsible positions.

Superintendents in their periodical rounds should make it a point to inform themselves as to whether in the exchange they visit there may not be material out of which managers can be made, and they should feel it their duty to advise with the managers of their exchanges on this subject. Thus it might happen that in an emergency they would know where to turn to fill an unexpected vacancy.

It has been said that a comparatively small number of telephone engineers are equipped with a thorough technical education. As a matter of fact, it may be said that the want of such an education is probably felt more keenly by the young man who is endeavoring to break into the telephone field than it is by the man actually established in telephone work. The sincere worker, who is actually interested in his chosen field with that interest which adds the glow of romance to even the dryest details of telephone technicalities, finds every day adding to his memory the bits of practical information which, after all, form the only real education. It is well to remember that the holder of a college diploma, lacking the inborn love of technical methods and machinery, cannot hope to hold his own against the certain upward progress of the young man whose only education consists of an irresistible fondness for the mysteries of wires and magnets.

Napoleon once said that every soldier in his army carried in his knapsack a marshal's baton, which simply meant that, by the display of intelligence, courage and loyalty, his humblest follower might rise to the highest command, and so it may be that men now in any company's employ in subordinate positions, may possess unsuspected capacity and talents which only require development to make of them valuable units in the company organization, and which, properly encouraged, will redound to their own benefit and ultimate advancement.

As to Competition

Editor TELEPHONE ENGINEER: I notice that you advise competition between telephone companies. You would be interested to know my experience with competition between telegraph companies.

When the Postal Telegraph Company's telegraph blanks were all gone, more were asked for, and until the new ones were received the Western Union Telegraph Company got all of our telegraph business. This incident seems trivial unless I tell you also that by some slip in the Postal offices the blanks were nearly six months in coming. Indeed, the Postal company noted that it was not getting our business and sent a man to inquire why. It was quite unpremeditated on our part, but the conditions were easily remembered, and the man was told just how it happened. We got the new supply of blanks very promptly.

Only a few months later, the Western Union messenger call box got out of order. We did not take the trouble to report this to the telegraph company; indeed, perhaps we did not know that it was out of order; we knew merely that when we pulled the Western Union box the boy did not come, and as is our custom, when one boy does not come on call we pull the other box for the other boy. After this happened a few times it became customary to pull the Postal box, because the Western Union boy would not come anyway, and the Postal got all of the business, whether written on Postal or Western Union blanks.

I have thought to write to you of this today, because only today the Western Union man came in to see why that company was not getting its share of our telegraph business. We told him just why, and now I suppose we will get our Western Union box fixed.

This is amusing, is it not? But would either of those companies be so careful of the quality of the service we are getting, if the other company, in competition, did not exist?

Our telephone company never has sent a man to this office to inquire whether our telephone service is satisfactory. And it isn't. If we had a competing telephone company, perhaps some interest would be taken in our telephone service, and some of the possible improvements would be made. Anyway, such a thought does not seem altogether an idle dream, when the two telegraph companies offer us such a close example.—A. H. R.

New Telephone for Wireless Work

A sensitive mono-telephone has been described by Henry Abraham before the French Academy of Science. In place of the ordinary diaphragm an armature of sheet iron is supported on two steel wires stretched tightly across the magnet of the telephone. The armature is of such size that it barely covers the magnet. The tone produced by the armature may be varied by adjusting the tension of the wire. The instrument is thus made as sensitive as the ordinary receiver, but is particularly sensitive to frequencies corresponding to the natural sound period of the armature. The instrument is particularly designed for use in wireless telegraphy on systems tuned to a certain wave length.—*Scientific American.*

Electrically Conductive Glass

A method of making glass which will conduct electricity is described in a paper read before the Royal Society of Edinburgh by Charles S. Phillips. The glass consists of 32 parts sodium silicate, 5 parts borax, 0.8 parts lead oxide, and 0.2 parts sodium antimoniate. This glass is not acted upon by acids, and has a resistance of about 1,000 times less than that of ordinary glass. It is used for the windows of electrometers and electroscopes, and in the latter instrument fibers of the glass have been used in place of the gold leaves.

Of Interest to the Trade

A Good Report

The Harvard Electric Company, New York City and Chicago, whose factory is located at the latter place, has arranged for a lecture course in order to give its employees a practical idea of electrical construction especially with regard to cable hangers, wire joints, sectional switch boxes, test connectors, lightning arresters, steel brackets, fuses, cable terminals, conduit boxes, etc. (specialties manufactured in the company's Chicago factory) in their many varied phases, uses and applicability instead of confining them to the knowledge of the certain parts which each makes. This lecture course is for the exclusive benefit of employees. It is planned to give short talks after the luncheon hour, and a recent experimental lecture showed the amount of interest aroused. At night there will be frequent illustrated lectures, and throughout the course authorities in the electrical engineering field will be called upon. Allen Lee Haase, sales manager and a "bracket engineer" will discuss all phases of the channel steel bracket and the "reasons why" it is more economical than wood or heavy malleable iron brackets. Frederic Greer, general manager of the company, will take up more general topics of pertinent interest.

The Harvard Electric Company reports that its eastern office has had an unprecedented rush of business lately and that the domestic business in conjunction with the export demand, has taxed to the utmost the large stock carried both at New York and Chicago.

Notwithstanding this, however, the company is making prompt deliveries of sectional switch boxes, bevel edge wire joints, channel steel brackets and all other Harvard "electrical necessities."

A Change of Name

The firm known as the Western Electrical Company, located at 411 South Tenth street, Omaha, Nebraska, will hereafter conduct its business under the name of the Johnston Electric Company. There will be no change in the business or the personnel of the company.

The reason President Johnston gives for making the change is a confusion of names which caused many delays and annoyances to customers, which the change in name will prevent.

Mr. Johnston has conducted an electrical supply business in Omaha under the name of the Western Electrical Company, for the last twenty years.

Important Indiana Legislation

By the passage of House Bill No. 273, introduced by Representative Wells, the Indiana Legislature has made an important amendment to the statute relating to the power of telephone companies incorporated in the state. The new act provides that any telephone company organized in the state shall have power to acquire by lease or purchase the lines, exchanges, franchises, rights and other property, or any part thereof, of other telephone companies, or to dispose of by lease or sale its lines, exchanges, franchise rights and other property, or any part thereof, and also shall have the power to acquire and hold stock and bonds of other telephone companies.

Until this amendment was made the law did not permit a company organized under the laws of Indiana to hold stock in any other company. On the other hand, the Central Union and other companies organized under the laws of other states have had such right and power. The amended law puts home companies on an equal footing with foreign companies and is expected to stimulate and strengthen the independent system in the state.

A Telephone Employees' Benefit Association

The Chicago Telephone Company, through its president, B. E. Sunny, announces the organization of a benefit association for its 8,000 employes. The plan is the result of several months' work by a committee appointed to investigate the subject. The company announces that it will contribute toward the benefit fund an amount equal to 50 per cent of all amounts paid in by the members.

Any employe, male or female, may join the association. Membership is entirely voluntary. Employes may join or resign at any time. In joining they are not asked to waive any legal rights against the company in case of injury.

The monthly dues and the benefits paid vary according to the rate of wages of the member; for example, an employe receiving $60 a month will pay dues of 60 cents a month, and in case of sickness for a period of not exceeding six months, will receive from the association a benefit of $1.20 a day. In case of such employee's death, the beneficiary is paid $120.

President Sunny says the company in joining in the formation of the association is actuated solely by the desire to promote the welfare of its employes.

One-half of the board of twelve trustees is chosen by the employes, and the other six members are appointed by the board of directors of the telephone company.

An Explanation

We are informed by the Chicago Telephone Company that the illustration entitled "Operator's Rest Room, Kedzie Exchange," which accompanied the article "Telephone Exchange Architecture," in March TELEPHONE ENGINEER, was really intended to show an undesirable condition. The room was disarranged somewhat before the picture was taken, with the idea of showing the matrons who care for such rooms how they should *not* look.

It is often said that the disorder of one is the order of another. At any rate, we venture to say that very few will have any criticism to offer on the appearance of the room in question.

Railway Telephones

The cuts used in illustrating the article entitled "The Telephone for Train Dispatching," by W. E. Harkness, in this number, were furnished by the Western Electric Company, Mr. Harkness being associated with that company. This company has equipped a number of railroads with the telephone dispatching systems in use today.

Considerable interest is being taken in North Dakota over the agitation in all parts of the state over the authority of towns to issue bonds for the construction of municipal telephone systems. The legal authorities are certain that the provisions of the state law are clear on this point and several cities in the state are likely to try the plan.

PERSONAL NOTES.

P. J. Beck, formerly in the traffic department of the Southwestern Telegraph and Telephone Company, Dallas, will assume charge of the Houston plant as local manager April 1.

E. G. Tillotson has been elected president of the Cuyahoga Telephone Company, Cleveland.

C. Y. McVey has been re-elected as general manager of the Cuyahoga Telephone Company.

C. C. Craig, general manager of the Northwestern Long Distance Telephone Company, has tendered his resignation and will become general manager of three allied independent telephone companies operated in Alameda, Oakland and Berkeley.

George A. Drew, Seward, Neb., has been appointed manager of the Nebraska Telephone Company, Fremont, Neb.

F. E. Brighton has been appointed to the managership of the Interstate Telephone Company's exchanges at Fort Plain, Canajoharie, St. Johnsville and Dodgeville, N. Y.

G. W. Kennedy, Centerville, Pa., has been appointed manager of the Home Telephone Company, Clarksville, Pa.

C. L. Brancher, Toledo, Ohio, has been appointed manager of the Independent Telephone Company, Elmore, Ohio.

Fred Speechley has been appointed manager of the Northwestern Telephone Company's exchange at Fargo, N. D. Mr. Speechley was formerly manager of the Douglas County Telephone Company at Superior, Wis.

T. W. R. Lowden, Beaumont, Texas, has been appointed manager of the Southwestern Telephone and Telegraph Company's exchange, Taylor, Texas.

D. F. Keefe, Ashland, Wis., has been appointed manager of the Douglas County Telephone Company, Superior, Wis.

F. B. Uhrig, manager of the Western Electric Company, Kansas City, has been transferred to St. Louis. He will be succeeded at Kansas City by C. H. Minor, formerly assistant manager at Kansas City. Mr. Uhrig is also district supervisor of the western district of the company.

J. H. Shoemaker, Waterloo, Iowa, has been re-elected president of the Iowa Independent Telephone Association.

H. B. Thayer, president of the Western Electric Company, has been elected vice-president of the American Telephone and Telegraph Company.

W. T. Gentry, Atlanta, Ga., has been elected president of the Southern Bell Telephone Company, to succeed Edward J. Hall, resigned.

R. P. Purchase has been appointed manager of the Mississippi Valley Telephone Company, Keokuk, Iowa.

William Jarrett has been appointed manager of the Mutual Telephone Company, Avoca, Iowa.

J. W. Bolinger, formerly of Fort Madison, Iowa, will have charge of the Iowa Telephone Company's plant at Muscatine, Iowa.

Herbert Smith has been appointed local manager of the Mississippi Valley Telephone Company, Muscatine, Iowa.

D. Russell, formerly manager of the Pacific Telephone and Telegraph Company at Colusa, Cal., has been appointed manager of the Colusa County Telephone Company.

Charles H. Wood has been appointed manager of the Automatic Home Telephone Company, Pontiac, Ill.

Edward Albrecht, Tiskilwa, Ill., has been appointed manager of the Bureau County Independent Telephone Company, Sheffield, Ill.

William Gibson, Rock Island, Ill., is the new manager of the Interstate Telephone Company, Sterling, Ill.

C. H. John, Batavia, Ill., has been transferred to Gary, Ind., as district manager of the Chicago Telephone Company.

B. F. Van Tress, Sheffield, Ill., has been appointed manager of the Bureau County Independent Telephone Company's exchange at Spring Valley, Ill.

G. W. Leverton, Horton, Kans., has been appointed manager of the new Kansas Independent Long Distance Telephone Company.

John Peirce, South Charlestown, Ohio, has gone to Honolulu, Hawaii, where he will install a new automatic telephone plant.

NEW TELEPHONE COMPANIES.

FLORENCE, SASK., CAN.—The Florence Rural Telephone Company has been incorporated with a capital stock of $5,000.

SOUTH ANTLER, SASK., CAN.—The South Antler Rural Telephone Company has been incorporated with a capital stock of $5,000.

SILVERTON, SASK., CAN.—The Silverton Rural Telephone Company has been incorporated; capital stock $5,000.

PRATTSVILLE, ARK.—D. M. Kelley is interested in the organization of a new telephone company.

DOTHAN, ALA.—The Newton Springs Telephone Company has been organized with a capital stock of $500, with the following officers: President, C. L. Jackson; secretary, J. D. Holton; treasurer, C. E. Gilstrap.

ANDERSONVILLE, GA.—Articles of incorporation have been filed for the Andersonville Telephone Company; capital stock $1,000. The incorporators are T. B. Bell, Thos. L. Bell and T. J. Harden.

OAKWOOD, GA.—The Gainesville and Oakwood Telephone Company has been organized with the following officers: President, J. W. W. Simmons; vice-president, J. N. Wallis; secretary, H. W. Crankshaw; treasurer, L. I. Hughes.

JONESBORO, GA.—Application has been made for a charter for the Riverdale Telephone Company; capital stock $1,000. Directors, G. M. Hine, B. S. Hine and R. T. Alderhold.

SHOBONIER, ILL.—The Vernon and Shobonier Telephone Company has been incorporated with a capital stock of $800 by R. F. Emerson, A. G. Wilson, E. A. Thomas.

NAUVOO, ILL.—The Independent Telephone and Telegraph Company has been incorporated with a capital stock of $15,000 by Daniel F. Flannery, Archibald McKinley and William McKinley.

WELLINGTON, ILL.—A farmers' telephone company has been organized with a capital stock of $2,500. Directors, John Benbow, John Lockhart, Daniel Stewart, Lloyd Austin, Monroe Garrison and others.

GLASFORD, ILL.—The Harkers Corners and Glasford Telephone Company has been incorporated with a capital stock of $1,500. Directors, D. J. Cowser, S. A. McQuown, N. T. Parr.

ROCKDALE, IND.—The Johnson Fork Telephone Company has been incorporated with a capital stock of $1,800. The directors are: J. D. Gold, Albert Mettler, H. G. Larue and Jas. Martashed, all of Harrison, Ohio.

SHELBURN, IND.—Articles of incorporation have been filed for the Central Mutual Telephone Company; capital stock $1,000. The directors are P. T. Lloyd, H. V. Stark, Elias Moore, W. H. Bennett.

CROSS PLAINS, IND.—The Farmers' Mutual Telephone Company has been organized with a capital stock of $890. The officers are: President, Daniel Denmore; secretary-treasurer, Martin Vanosdall.

MILES, IOWA.—The Miles and Bryant Telephone Company has been organized with a capital stock of $500, with the following officers: President, William Bates; vice-president, J. P. Milhaem; secretary, John Dierks.

GAZA, IOWA.—The Gaza Farmers' Mutual Telephone Company has been incorporated with a capital stock of $500 by H. H. McCall, Simon T. Jassen and others.

EDGEWOOD, IOWA.—The Edgewood Farmers' Telephone Company has been incorporated with a capital stock of $2,000, with the following officers: President, R. L. Phelps; vice-president, J. A. Stone; secretary, J. S. Wait; treasurer, U. G. Elliott.

MERIDEN, IOWA.—The Farmers' Telephone Company of Meriden has been organized with officers as follows: President, J. E. Weise; secretary, D. Holly; treasurer, Robt. Miles.

COATS, KANS.—The Coats and Southwestern Telephone Company has been incorporated with a capital stock of $10,000, by J. I. Latham, Croft, Kans.; J. N. Bibb, Coats, Kans., and others.

UNION, KY.—The Union Telephone Company has been incorporated by J. M. Moore, S. S. Miller, H. A. Yancey, J. G. Evans, Dr. J. W. Robertson, A. L. Ramage, George W. Jolly; capital stock $1,000.

COLUMBUS, KY.—The Columbus Telephone Company has been organized; capital stock $2,000. Among those interested are Charles W. Dupree, J. H. Fisher, Henry Gale.

STACEY, KY.—The Stacey Telephone Company has been incorporated by S. F. Maggard, manager; D. B. Bales, George McIntyre; capital stock $2,000.

BOLES, KY.—The Boles Home Telephone Company has been incorporated by Otto Maxey, N. S. Reneau and J. F. Marr.

THREE OAKS, MICH.—The Chikaming and Weesaw Telephone Company has filed articles of incorporation with a capital stock of $2,000.

CHAPIN, MICH.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $10,000. The directors are H. L. Fox, C. W. Sutliff, A. McClelland and others.

NEW BALTIMORE, MICH.—The Anchor Bay Telephone Company has been organized with the following officers: President, H. J. Knopf; treasurer, H. M. LaBounty; secretary, A. J. Christie.

CRYSTAL, MICH.—The Crystal Telephone Company has been incorporated with a capital stock of $5,000. The officers of the company are as follows: President, J. P. Spencer; vice-president, George Ingersol; secretary, R. L. Ruedger; treasurer, George Felton; general manager, J. G. Devoe.

WOODSTOCK, MICH.—The North Star Telephone Company has been incorporated with a capital stock of $120,000.

WYANDOTTE, MICH.—The Detroit River Telephone Company has been incorporated with a capital stock of $50,000. The incorporators are: F. T. Moran, Arthur E. Barker, James E. Brailey, S. E. Fisher, T. A. E. Weadlock.

WHITEFORD CENTER, MICH.—The Whiteford Farmers' Telephone Company has been incorporated with a capital stock of $10,000.

KERKHOVEN, MINN.—The Murdock-Kerkhoven Telephone Company has been organized with the following officers: President, E. T. Dana; secretary, L. S. Lawson; treasurer, William Pothen.

PINE RIVER, MINN.—The Pine River Rural Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are F. R. Anderson, H. H. Hill, Frank L. Hill, James F. Geary, Charles W. LaDu.

SAUK CENTER, MINN.—The Drogar Telephone Company has been reorganized and incorporated under the name of the Little Sauk Center Telephone Company. The officers are as follows: President, G. M. Devo; treasurer, Alex Dryden; secretary, Ralph C. Doty.

BRAINERD, MINN.—The Daggett Brook and Southern Telephone Company has been organized with the following officers: President, Frank Kienow; vice-president, Frank Wolvert; secretary-treasurer, Leroy Sewell.

ST. JOSEPH, MO.—The Citizens' Telephone Company has been reorganized under the name of the Home Telephone Company and has incorporated with a capital stock of $2,000,000. The incorporators are: Theodore Gary, president; Homer E. Scovern, secretary.

NORTH PLATTE, NEB.—The South Side Mutual Telephone Company has been incorporated with a capital stock of $5,000. Interested are J. W. Crow, J. L. Shuck and others.

MINDEN, NEB.—The Logan Township Independent Telephone Company has been organized.

STAMFORD, NEB.—The Highline Mutual Telephone Company has been incorporated with a capital stock of $10,000 by I. K. Ashford, Charles Hopper and others.

SHERWOOD, N. D.—The Barber Telephone Company has been organized with the following officers: President, O. R. Walker; secretary-treasurer, W. J. Doyle.

HARLEMVILLE, N. Y.—The Harlemville-Chatham Co-operative Telephone Company has been organized with a capital stock of $600 by John B. Jones and William H. Angel, Ghent, and John Freehan and Frank Wolfe, Austerlitz.

FARGO, N. D.—The Harvey Telephone Company has been incorporated with a capital stock of $50,000 by L. H. Olsson, A. Connut, John Bolstad and others of Fargo.

MOSIER, ORE.—The Mosier Valley Telephone Company has been incorporated with a capital stock of $1,200 by A. P. Bateham, J. K. McGregor, Lee Evans.

BURNS, ORE.—The Eastern Oregon Telephone and Telegraph Company has been organized with the following officers: President, John R. Jenkins; vice-president, C. H. Voeghty; secretary-treasurer, Ben Brown.

HARRISBURG, PA.—The Erie County Telephone Company has been organized with a capital stock of $40,000. The directors are William K. Andrews, John H. Wright and James R. Andrews.

SHAWVILLE, PA.—The Shawville Rural Telephone Company has been organized with the following officers: President, Harrison Straw; vice-president, A. B. Lansberry; secretary, E. E. Murray.

CHAMBERSBURG, PA.—The Letterkenny Telephone Company has been organized with the following officers: President, Reuben Rife; secretary, William B. Schaeffer; treasurer, Daniel Hunsecker.

GARY, S. D.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $20,000 by F. H. Greene, A. E. Fales and George W. Horton.

LEWISBURG, TENN.—The Cornersville Telephone Company has been incorporated by W. B. London, A. Jones, W. G. Wilkinson and others.

HAMILTON, TEX.—The Hamilton-Hico Telephone Company has been incorporated by J. W. Weiser, V. E. Weiser and Sidney G. Ross, with a capital stock of $20,000.

CHEYENNE, WYO.—The American Telephone and Telegraph Company has been incorporated with a capital stock of $10,000. The directors are Charles R. Bangs, C. W. Burdick, C. D. M. Cole, Melville Egleston, James C. Vail.

BANGS, WYO.—The Lower Snake River Telephone Company has been incorporated by J. W. Cavender.

LUTHER, WYO.—The Golden Prairie Mutual Telephone Company has been organized with Edward Berglund as manager.

FRANCHISES ASKED AND GRANTED.

TILBURY, ONT., CAN.—The Tilbury Telephone Company, Ltd., has been granted a 20-year franchise in this city.

LONDON, ONT., CAN.—The Bell Telephone Company will ask for a renewal of its franchise, which expires at the close of the present year.

DAYTONA, FLA.—E. L. Potter and others have applied to the city council for a franchise for a telephone system.

PRAIRIE GROVE, ARK.—The Prairie Grove Telephone Company has been granted a 25-year franchise.

POCATELLO, IDAHO.—The Montana Independent Telephone Company has been granted a 50-year franchise in this city.

EVANSVILLE, IND.—The Blue Grass Telephone Company has applied for a franchise to construct telephone lines in the county.

PITTSBURG, KANS.—The Military Telephone Company has applied for a franchise to build telephone lines in this vicinity.

RENSSELAER, IND.—The local telephone company is seeking a new franchise.

LOUISVILLE, KY.—The Home Telephone Company has made application for a new franchise in this city.

FRAZEE, MINN.—E. F. Gummer and B. Y. McNairy have been granted a franchise in this city.

WINSTON-SALEM, N. C.—The county commissioners have granted a franchise to John D. Williams and others.

BRADNER, OHIO.—A franchise has been granted H. E. Graham to install a local telephone system.

NEW LEXINGTON, OHIO.—The Citizens' Telephone Company of this place has been granted a franchise to install a telephone system at Somerset.

TUCUMCARI, N. M.—The El Paso and Silver City Telephone Company has applied for a franchise to install a telephone system in this place.

MEDFORD, ORE.—The Citizens' Telephone Company has made application for a franchise to operate in this place.

GRANTS PASS, ORE.—The Citizens' Telephone Company has been granted a 35-year franchise by the city council.

SALEM, ORE.—The county court has granted a franchise to the Big Four Telephone Company to construct a line from Butteville to Gervais.

BEAVER, PA.—The Beaver County Telephone Company has applied for a franchise in this place.

WASHINGTON, PA.—The East Washington council has granted a franchise to the National Telephone Company.

HOQUIAM, WASH.—An ordinance granting the Pacific States Telephone Company a franchise to operate in this city for twenty years, has been introduced into the city council.

PROSSER, WASH.—Attorney C. E. Forsyth of White Bluffs has secured a franchise for the White Bluffs and Columbia River Telephone Company.

RAYMOND, WASH.—A franchise has been granted to W. W. Cannon, who will rebuild the local system.

VANCOUVER, WASH.—The Minnehaha Co-operative Telephone Association has been granted a franchise to operate in this county.

WHEELING, W. VA.—The Farmers' Mutual Telephone Company has made application to the board of county commissioners for a franchise to operate in the county.

FINANCIAL ITEMS.

YORKTON, SASK., CAN.—The Yorkton Northwest Electric Light and Telephone Company will increase its capital stock from $20,000 to $50,000.

LITTLE ROCK, ARK.—The Rector Co-operative Telephone Company has filed with the secretary of state notice of increase of capital stock from $5,000 to $15,000.

MULLAN, IDAHO.—The North Idaho Telephone Company will increase its capital stock from $25,000 to $100,000.

ADDIEVILLE, ILL.—The Addieville Mutual Telephone Company has increased its capital stock.

WHITESTOWN, IND.—The Whitestown Citizens Telephone Company has increased its capital stock from $1,800 to $20,625.

GRAINFIELD, KANS.—The Gove County Telephone Company has increased its capital stock to $10,000.

BEVERLY, KANS.—The Beverly Telephone Company has increased its capital stock to $10,000.

PULASKI, KY.—The Somerset and Devel Green Telephone Company has increased its capital stock from $12,000 to $21,000.

SANDUSKY, MICH.—The Sandusky Telephone Company will increase its capital stock from $4,000 to $20,000.

TOLEDO, OHIO.—The United States Telephone Company has increased its capital stock from $5,000,000 to $5,500,000.

PARIS, OHIO.—The Farmers and Merchants' Telephone Company has increased its capital stock from $1,200 to $21,000.

WAUSAU, WIS.—The Wausau Telephone Company has increased its capital stock from $20,000 to $60,000.

CUMBERLAND, WIS.—The McKinley Telephone Company will increase its capital stock to $10,000.

NEWTON, WIS.—The Newton-Manitowoc Telephone Company has increased its capital stock from $2,000 to $4,000.

WAUKESHA, WIS.—The Prospect, Guthrie and Big Bend Telephone Company has increased its capital stock from $3,000 to $10,000.

WEATHERFORD, OKLA.—The Farmers' Mutual Telephone Company Exchange has increased its capital stock.

MILWAUKEE, WIS.—The Beef River Valley Telephone Company has increased its capital stock from $2,000 to $5,000.

MISCELLANEOUS.

WINNIPEG, MAN., CAN.—The Canadian Pacific Railway will make a test of dispatching by telephone along its lines in Western Canada.

SASKATOON, SASK., CAN.—The Northwestern Telephone Company has issued $35,000 worth of new stock to be used in organizing rural telephone companies.

WINNIPEG, MAN., CAN.—The Department of Telephones, in connection with the legislature, has been abolished and the operation of the government telephone system in future will be carried on by the Manitoba Telephone Commission.

PRATT CITY, ALA.—The People's Home Telephone Company will install a new switchboard and make other improvements.

DEMOPOLIS, ALA.—The Demopolis Telephone Company is preparing to build a metallic line to Gallion, Prairieville, Allenville and Lanesville.

MOBILE, ALA.—It is stated that the Home Telephone Company will expend $75,000 in improvements and extensions.

JONESBORO, ARK.—L. W. Fielding, manager of the Home Telephone Company of this place, and others have purchased the telephone exchange at Lake City and will operate under the name of the People's Telephone Company, with Floyd Smith as manager.

WASHINGTON, ARK.—The Valley Telephone Company of Warren, Ark., will install a telephone system in this place.

PHOENIX, ARIZ.—The Consolidated Telephone and Telegraph Company will spend $30,000 in extending and improving its system.

SAN BERNARDINO, CAL.—Announcement is made that the Home Telephone Company will spend $50,000 in improving its system in this city, the greater part being underground work.

PHELPS, ILL.—The Berwich Telephone Company contemplates extending its lines through this vicinity.

KANKAKEE, ILL.—The Central Union Telephone Company will construct a new exchange building in this city.

CHATSWORTH, ILL.—The Chatsworth Telephone Exchange has been purchased by W. P. McHenry, Shelbina, Mo.

FLAGG CENTER, ILL.—The Babcock telephone line has been purchased by the farmers in this vicinity, who will install a new switchboard in this place.

CHANDLER, IND.—The Chandler Telephone Company will install an exchange at Booneville.

LEBANON, IND.—A deal has been completed whereby the Co-operative Telephone Company becomes the owner of the Thornton Telephone Company.

TERRE HAUTE, IND.—The Citizens' Telephone Company will make important extensions and improvements during the year.

SOUTH BEND, IND.—District Superintendent John L. Putnam announces that the entire plant of the Central Union Telephone Company will be rebuilt during the present year, at an estimated expenditure of $200,000.

MILLVILLE, IND.—The Millville Telephone Company will extend and improve its system.

CORNING, IA.—The Corning Telephone Company will improve its local system.

BELLEVILLE, KANS.—The Belleville Telephone Company will install a new switchboard at a cost of $2,500.

NORTONVILLE, KANS.—The Potter telephone system will be rebuilt, under the supervision of Manager Yoakum.

WINFIELD, KANS.—W. T. Reeder and J. M. Pierce are planning for the extension of the local telephone system.

WEST MINERAL, KANS.—A deal has been consummated whereby G. A. Welbourne of Carl Junction, Mo., becomes owner of the Mineral telephone system.

ELLIS, KANS.—J. E. Hull, of Neodesha, has purchased the local telephone system and will make various improvements and extensions.

HUMBOLDT, KANS.—The Humboldt Telephone Company will install a new switchboard.

PARTRIDGE, KY.—The Upper Cumberland River Telephone Company will construct additional lines.

BOYNE, MICH.—The Swaverly Telephone Company contemplates installing an exchange in this place.

BALTIMORE, MD.—The Chesapeake and Potomac Telephone Company will erect a new exchange in this city.

ST. JOSEPH, MO.—The Home Telephone Company, formerly the Citizens' Telephone Company, contemplates the expenditure of $750,000 in the improvement of its plant within the next twelve months.

KANDIYOHI, MINN.—The lines of the Kandiyohi Telephone Company in the vicinity of Bird Island have been purchased by the Bird Island Telephone Company.

LONG PRAIRIE, MINN.—The Leslie Telephone Company will construct a line to Reynolds.

GREAT FALLS, MONT.—J. C. Ball, representing the Montana Independent Telephone Company, Butte, Mont., is making arrangements to extend his line into this city.

HARVARD, NEB.—The Harvard Telephone Company will extend its rural system and install additional cable.

CORFU, N. Y.—The Darien Telephone Company will extend its system during the year.

BUCYRUS, OHIO.—Owing to the rapid growth of its business, the Bucyrus Telephone Company is considering a new system for the city.

ARCADIA, OHIO.—The Arcadia Telephone Company will rebuild its lines and install a new switchboard.

SOMERSET, OHIO.—The Citizens' Independent Telephone Company, New Lexington, Ohio, will install a new exchange in this place.

DAYTON, OHIO.—It is stated the Dayton Home Telephone Company will spend in the neighborhood of $100,000 in improvements during the coming year.

LITTLETON, N. H.—The Littleton Telephone Company will soon begin the construction of its system.

HOLLIS, OKLA.—The Hollis Telephone Company will install an exchange at this place.

SALEM, ORE.—The People's Telephone Company is planning extensive improvements.

REITZ, PA.—The Central Telephone Company will extend its lines.

LAWN, PA.—The Mastersonville telephone line extending from this place to Manheim has been purchased by B. S. Stauffer, who will construct a line from Manheim to Mt. Joy.

CHEHALIS, WASH.—The Chehalis and Boistfort Telephone Company will make extensive improvements and extensions during the coming year.

SOUTH BEND, WASH.—W. W. Connon, of Centralis, has purchased the telephone system in this place and has applied for a franchise.

CUMBERLAND, WIS.—The McKinley Telephone Company will install a local exchange.

MOSEL, WIS.—The Mosel-Centerville Telephone Company plans to make several extensions.

DORCHESTER, WIS.—The Brecke Telephone Company will change its name to the Interurban Telephone Company.

WHEELING, W. VA.—The National Telephone Company, of this city, has purchased the Woodsville Telephone Company, operating in Monroe county, Ohio, for $540,000. Improvements will be made.